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Some Clinical Aspects of Protein Nutrition
Co Tui, M.D.

Filling the Special Diet Prescription: High Protein Diets
Capt. Miriam E. Perry, M.D.D., A.U.S.

Biological Value of Food Yeast Proteins and Their Role as Supplements to the Proteins of the Cereal Grains
Barnett Sure

Effect of Large Scale Methods of Preparation on Vitamin Content of Foods: I. Potatoes
Frank Streightoff, Hazel E. Munsell, Ben-Ami Ben-Dor, Martha Louise Orr, Relda Cailleau, Mary Haines Leonard, Sarah R. Ezekiel, Ruth Kornblum, and Frederick G. Koch

Some Factors Influencing the Food Intake of Preschool Children
Catherine L. Justice, Marion L. Mattson, and Cecilia Schuck

A Further Analysis of Food Selections of 80 Families in Lubbock, Texas
Mina Wolf Lamb and Marie Tarwater Corrington

A.D.A. Annual Meeting, Cincinnati, October 14–18, 1946

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Some Clinical Aspects of Protein Nutrition[1]

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THERE are at least five body functions with which protein nutrition is intimately associated. These are:

1. Maintenance of blood volume.
2. Wound healing.
3. Maintenance of tissue integrity.
4. Elaboration of antibodies.
5. Convalescence.

Topics 2 and 3 I have taken up at length elsewhere (1, 2) and so shall not refer to them here. On Topic 4 I have done no original work, so I shall simply refer you to Cannon's pioneer work (3, 4). I shall discuss at some length Topics 1 and 5.

ROLE OF PROTEINS IN MAINTENANCE OF BLOOD VOLUME

This is the most urgent function of proteins and may be said to be an emergency one. In order to arrive at a clearer understanding of this, it may be useful to go back to elementals and consider the various fluid compartments of the body as established by the monumental work of Gamble (5). Figure 1 is the schema used by this author, showing the partition of body fluids into three compartments—the intracellular, the interstitial, and the plasma compartments, consisting respectively of 50, 15, and 5 per cent of the total body weight. These two last compartments together comprise the extracellular compartment.

[1] Read in part before the American Association for the Advancement of Science Conference on Food and Nutrition, Gibson Island, July 16, 1945. Received for publication September 24, 1945. The work described in this paper was done under a contract recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and New York University.

This paper represents the work, not only of the author, but also of a group of collaborators—among them Drs. Arthur M. Wright, John H. Mulholland, Irving Barcham, George R. Gerst, N. Habaluyas Kuo, Gerald T. McCarthy; the nursing staff—Mary Coughlin, Shirley Johansen, Helen Koestner, Mary Fluellen, Ruth Hallopeter; the chemical staff—Mrs. Lilly Schmidt, Mrs. Dorrit Eissler, Frieda Wolf, Sally Sells, Louis Sutherland, and Arthur Wallen. Grateful thanks are due to Rosa Komeier for her help in the preparation of this paper.

Grateful acknowledgment is made of Dr. Cecil K. Drinker's instructions in lymph work, and of Dr. Bacon Chow's cooperation on plasmaphoresis.

The Plasma or Circulatory Compartment. It is the plasma compartment with which we are immediately concerned, and I prefer to call it the circulatory compartment because this term denotes active movement. One has only to remember the intricacy of the anatomy of the circulatory system and the numerous reflexes and safeguards with which it is endowed, to recognize its value to the living organism. For it is around this river of life that the body cells are built and have their existence. Upon the maintenance of the integrity of this body of rapidly surging fluids depend the intactness of internal respiration and the immediacy of life.

This is the only compartment that may be said to be under the active control of the organism, changes in the others being dependent upon chemical or physico-chemical processes which take a comparatively long time to effectuate. In a somewhat oversimplified way, the plasma compartment may be thought of as a sac of fluids maintained at a definite volume (5 per cent of body weight) and a definite tension—120 mm. mercury, called the blood pressure. It is armed with a detector mechanism in the "vasosensible" areas (6). Any fall in this tension is immediately detected and relayed to the nervous centers which instantly send impulses to narrow down the sac, raising the tension back to normal and at the same time sacrificing the volume. This slack-tightening mechanism is the vasoconstrictor mechanism mediated through the sympathetic system. Simultaneously, adrenaline is poured into the blood stream and distributed peripherally to maintain and support the processes brought about by nervous stimulation. The heart beat speeds up, respiratory exchange is promoted, sugar is discharged into the blood stream, and the animal may be said to be fully mobilized, for combat if necessary, and to maintain the integrity of the vital sac of fluids. Incidentally, it is the sympathetic effects which account for many of the symptoms of impending shock.

The sacrifice of volume to maintain tension may be called a homeostatic and compensatory mechanism. It has, however, its limits. If one third of the blood volume is lost, this compensatory process is

exhausted and further diminution results in a fall of the blood pressure which, if it reaches the critical level, constitutes shock.

How are proteins concerned with maintaining the integrity of this compartment? Just as the body

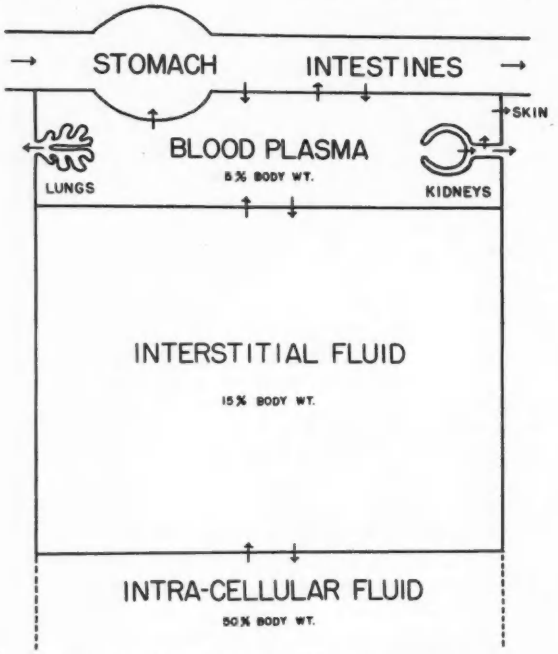

FIG. 1. *Fluid compartments of the body, after Gamble.*

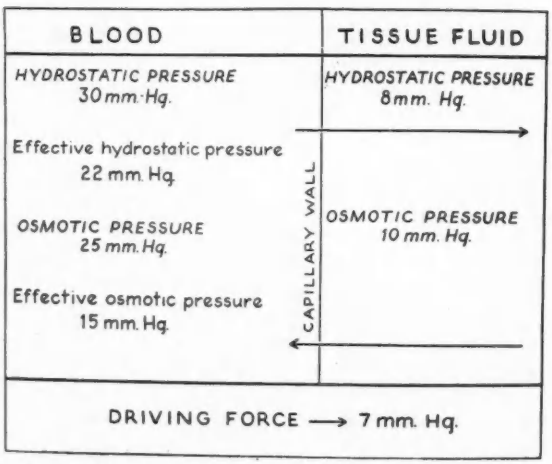

FIG. 2. *Balance of forces between blood and tissue, regulating fluid exchange.*

may be said to use sodium chloride to preserve its entire fluid integrity against the external world, so the circulatory compartment may be said to maintain its individual integrity against the other compartments by the use of the plasma proteins.

Figure 2 is the schema used by Best and Taylor (7) to illustrate the balance of forces between the blood and the tissues as postulated by Starling (8).

It will be seen that while the hydrostatic component as furnished by the blood pressure tends to drive the fluids out of the circulation, it is the osmotic pressure which keeps the fluids in the circulation. Krogh (9) has stated that if all the capillary membranes of the entire body were to be made into one sheet, it would make a carpet 4 feet wide and several miles long, and that the 3 odd liters of fluid would leak out of the plasma compartment in a matter of seconds were there no mechanism for retaining it. How true this statement is, no one can tell, but if it were only half true, it would still serve as a striking reminder of the role of the plasma proteins whose osmotic pressure furnishes this retentive mechanism. The blood proteins normally have a level of from 6.5 to 7.5 gm. per cent, and an average person would have a total circulating protein of from 195 to 210 gm. It is the surgical consensus that shock states, other than hemorrhagic shock, are produced by injuries which cause a loss of proteins from the blood, a fall of osmotic pressure, and a consequent inability of the circulating compartment to retain water. When this loss goes beyond the point of compensation, a shock state supervenes as in traumatic shock and in many cases of burns. This type of shock may be called decompensated hypoproteinemic hypovolemia.

In chronic states of malnutrition with hypoproteinemia, where most of the deficiency is accounted for by a loss of the albumin moiety, it is to be expected that a state of shock would be more easily induced. This is exemplified in severe burns, in which skin grafting, by opening up more areas of protein exudation, may lead to the development of shock (10). However, as a result of the work of Warren, Merrill and Stead (11) on the influence of the interstitial fluid on the development of shock, the picture here may be somewhat more complicated.

The question arises: Through what channels are the blood proteins replenished? Work reported from my laboratory in 1942 (12) and represented in Figure 3 may be cited here. If a normal dog is bled one fourth of its blood volume, the blood protein level returns to normal in from 18 to 24 hr. However, if the thoracic duct is ligated and a similar bleeding is performed, it may take as long as 9 to 14 days before the initial level is reached. If at this time the dogs are killed and autopsied, the accessory lymphatic ducts are found to be greatly dilated, showing the development of collateral circulation.

On the basis of this work it was postulated that the lymphatic system was the principal pathway for the mobilization of proteins from the tissues, particularly the liver, into the circulatory compartment. This hypothesis has been adumbrated by both Drinker and Yoffey (13) and Peters (14) who in

1935 stated "without attempting to solve this mystery (origin of the serum proteins) by ascribing their production to lymphatics or any organ, attention may be called to the fact that present theories postulate a circuit from blood to lymph and back again ad infinitum, without provision for attrition and renewal. Unless they arise in the blood, as they cannot gain access to the circulation directly, the serum proteins must be conveyed to it through the lymph. Some part of the lymph proteins from some regions of the body then is presumably making its first voyage to the veins."

Some of the implications of this hypothesis may be set forth, if only to serve as scaffolding for further work on this hitherto obscure subject. It was formerly thought that the proteins in the lymph were principally leakage proteins from the blood (13). In the light of this new interpretation, we must begin to think of lymph proteins as consisting of two moieties—leakage proteins and new proteins added by the tissues as they are laved by the lymph flowing by. Nor is this movement a one-way traffic, since it has been shown by various workers that when the protein content of the blood is high, there is a tendency for it to leak into the tissues (12). This accords with Madden and Whipple's (15) concept of a dynamic equilibrium between the tissues and the blood.

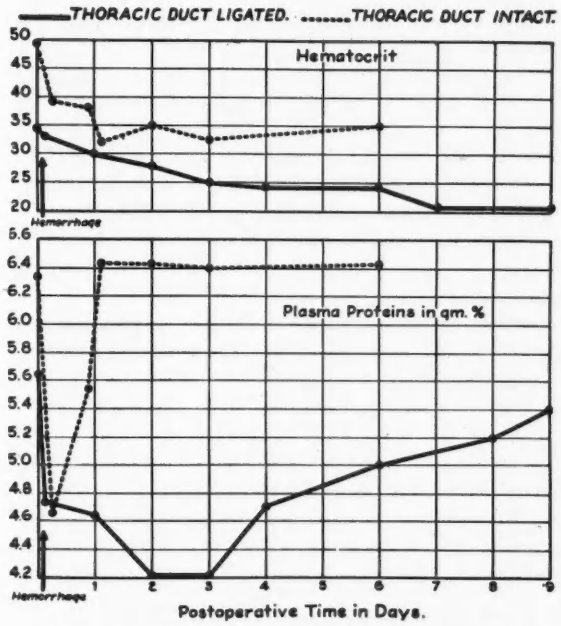

FIG. 3. *Graphs illustrating hematocrit and plasma protein patterns of Groups I and II. Solid lines represent curves of a dog with thoracic duct ligated and the broken lines represent curves of a dog with thoracic duct intact.*

Some preliminary experiments on the relation between plasma protein levels and the rate of lymph flow and the level of lymph proteins are shown in Table 1.

Dogs 1 and 2 were normal animals, that is, animals who were given high protein feeding for a period of 3 to 4 weeks until there was a gain in weight and the animals looked sleek and healthy. Their blood proteins were, as can be seen, rather high. Dog 3 was in average nutrition for an experimental dog, and had a blood protein level near the lower level of normal, namely, 5.44 gm. per cent. Dogs 4, 5 and 6 were all fed a protein-free diet used by Allison in his own work (16) for 2 to 3 months until the blood protein level fell below 5 gm. per cent. All animals were anesthetized with Nembutal injected intravenously (30 mg. per kilogram body weight). Because of the relaxation and body immobility caused by the anesthesia, the lymph flow would be expected to be low. The thoracic duct was cannulated and enough lymph for protein study was collected. The volume of some 10 to 30 cc. needed for this purpose took from one half to 2 hr. to collect. The blood proteins were determined just before the collection of the lymph and at the end, and the two figures averaged. There was never any significant variation between these two figures.

As will be seen from Table 1, there were 3 animals in which the blood proteins were above 5 gm. per cent and 3 in which they were below 5 gm. per cent. In the 3 in the higher blood protein group the lymph flow varied from .24 to .4 cc. per minute; the lymph proteins from 3.74 to 4.53 gm. per cent, figures which tally well with those of Drinker and Yoffey (13) for normal dogs. In only 1 animal (Dog 1) was the Tiselius pattern determined, and in both plasma and lymph the albumin was high. After massage the lymph flow increased several-fold as has been pointed out by Drinker and Yoffey, and the protein concentration decreased slightly, making for an absolute increase of protein output in the lymph.

In the low protein animals, 2 had no spontaneous lymph flow and one had a flow of .2 cc. per minute. In this one the lymph protein level was definitely lower than in Dogs 1, 2 and 3. Massage here also increased the flow, again reducing the protein concentration in the one dog in which a pre-massage sample was obtained for comparison. The blood and lymph of these 3 animals all had the electrophoretic pattern determined. In both blood and lymph there was low albumin content and an increase in the globulins, particularly in the gamma globulin. This is in accord with the findings of Chow (17) on starved animals.

The above findings suggest that both the rate of lymph flow and the level of lymph proteins may be conditioned by the nutritional state of the animal. If these interpretations, and the hypothesis that a significant part of lymph proteins may be new proteins mobilized from the tissues into the blood, are confirmed, then the lymphatic apparatus should play a considerable part in the development of the shock picture, and hypoproteinic[2] (protein deficient) animals should be more liable to shock. An analogous explanation would apply to Elman's findings of the longer survival time of dogs bled a lethal amount, but allowed to move about (massaged) (18) or given Amigen intravenously (19). This latter measure, we have found, increases lymph flow (20).

[2] *Editor's Note:* The author is proposing the term *hypoproteinia* to denote protein deficiency—it would parallel such terms as "anoxia" which connotes systemic oxygen deficiency, as contradistinguished from anoxemia—blood oxygen deficiency.

TABLE 1

Relation between plasma protein levels, rate of lymph flow and level of lymph proteins in dogs

EXP. NO.	PLASMA PROTEIN	TISELIUS PATTERN PLASMA PROTEIN				RATE OF LYMPH FLOW	LYMPH PROTEIN	TISELIUS PATTERN LYMPH PROTEIN			
		Alb.	Alpha	Beta	Gamma			Alb.	Alpha	Beta	Gamma
	gm. %					*cc./min.*	*gm. %*				
1	6.9	53	12	25	10	.4	3.74	62	15	13	10
						.131*	3.71*				
2	6.4					.25	4.09				
3	5.44					.24	4.53				
						1.2*	3.79*				
4	5.03					.65	5.17				
						1.53*	3.44*				
5	4.93	28	22	29	21	0					
						.054*	2.39*	28	21	34	17
6	4.62	27	24	41	11	.2	2.41	18	25	35	22
						1.25*	1.39	30	26	31	13
7	4.60	13	22	41	24	0	.9	24	28	26	22

* Massage.

Note:

1. Tendency for low albumin in dogs and high gamma globulin—same in lymph.
2. Extremely low figures for low lymph protein in hypoproteinemic dogs— (a) less leakage, (b) less contributed by tissues.
3. Tendency for lymph flow to be small in hypoproteinemic dogs.
4. Massage stimulates lymph flow, reduces lymph proteins, but lowering of protein not commensurate with increased flow.

TABLE 2

Low nitrogen intake in post-gastrectomy

NAME	N INTAKE WEIGHT	N LOSS WEIGHT X DAY	DAYS UNDER STUDY	LOSS OF WEIGHT	RETURN TO INITIAL E.T.*	DAYS IN BED	REMARKS
	gm./KBW	*gm./KBW*		*kg.*	*days*		
P. B.	.04	.153	8	4.27		23	
F. Mc.	.04	.015	12	6.59	not 12th	17	
J. S.	.04	.207	8	3.89		17	
D. R.	.052	.165	11	.9		35	evisceration
N. G.	.06	—	12	7.8		24	
A. D.	.07	.183	10	4.78		19	
G. W.	.08	.089	13	5.26		17	
R. B.	.095	.159	8	.48		21	
F. W.	.095	.065	12	4.45		21	
M. K.	.11	.237	9	6.19	not 12th	13	Amigen—prepared
W. C.	.18	.088	9	4.05		13	Amigen—prepared
J. B.	.19	.078	10	1.7		37	
A. S.	.27	.015	9	4.37		17	
Average days						21.07	

* E. T. = Ergograph time in seconds.

This field of investigation is a promising one, and it is our aim to go into it further as soon as opportunity presents itself.

CONVALESCENCE

The importance of adequate protein nutrition in convalescence is indicated by our work, previously

reported (21, 22), on gastrectomy cases. It was shown that patients undergoing gastrectomy, if fed an amino acid mixture (Amigen) and a high caloric diet, could be spared the marked loss of weight and prolonged period of debility which attended cases on the usual hospital ward regimen. These patients were weighed periodically, the nitrogen balance recorded, and their ergographic performances determined from time to time during their convalescence. Also followed was the period when the patients asked to get out of bed. It will be seen from Tables 2 and 3 that those on a low nitrogen intake had a negative nitrogen balance, that all had lost weight, that their ergographic performances were poorer (not returning to the initial time in 12 days) and that their bed period averaged 22 days; while in the group in Table 3, all on high nitrogen intake were in positive nitrogen balance, gained weight, had superior ergographic performances, and got out of bed in an

TABLE 3

High nitrogen intake in post-gastrectomy cases

NAME	N INTAKE WEIGHT	N GAIN WEIGHT X DAY	DAYS UNDER STUDY	WEIGHT GAIN	RETURN TO INITIAL E.T.	DAYS IN BED
	gm./KBW	*gm./KBW*		*kg.*	*day*	
A. V.	.25	.069	7	1.14		22
G. H.	.42	.049	13	2.2		13
V. B.	.434	.169	12	4.71		14
P. R.	.44	.077	8	4.54		8
G. S.	.44	—	8	6.0		8
A. V.	.48	.14	11	4.54	before 8th	9
F. R.	.482	.217	11	3.95		17
A. H.	.5	—	—	4.0		10
N. C.	.6	.212	12	5.3	before 8th	10
R. B.	.6	.241	10	4.32	before 8th	10
E. B.	.61	.303	11	5.85		10
P. F.	.692	.2	12	4.21		14
Average days						12.08

average of 12.5 days. A comparison of the levels of nitrogen intake in both series showed that in gastrectomy cases there seemed to be a critical zone, above which all cases were in positive nitrogen balance, and below which all went into negative nitrogen balance. This zone seemed to lie between .25 and .355 gm. nitrogen per kilogram body weight.

The answer to a fundamental question, Is there a specific zone of nitrogen intake for each disease category? will not be forthcoming until a number of disease categories have been investigated systematically. So far three other surgical categories have been investigated: cholecystectomy, herniotomy, and appendectomy cases. The preliminary results seem to support the hypothesis of the critical zone of intake.

Table 4 shows 9 cases of cholecystectomy. Here only 2 have had ergographic tests performed but these follow the same trend as the gastrectomy cases. The critical zone of nitrogen intake seems to lie between .224 and .339 gm. nitrogen per kilogram body weight.

Table 5 shows the 7 cases of appendectomy and Table 6, the 22 cases of herniotomy, 17 unilateral and 5 bilateral. The critical zone of intake in the appendectomy cases was between .184 to .359 gm. nitrogen per kilogram body weight, and in the unilateral herniotomy cases, between .17 and .23 gm. Unfortunately, during most of the investigational period in these two groups, the ergograph was out of order. However, the weights of the patients were

TABLE 4

Nitrogen intake in post-cholecystectomy cases

NAME	N INTAKE WEIGHT	N GAIN OR LOSS WEIGHT X DAY	DAYS UNDER STUDY	WEIGHT GAIN OR LOSS	RETURN TO INITIAL E.T.	DAYS IN BED
	gm./KBW	*gm./KBW*		*kg.*	*day*	
A. C.	.089	−.104	12	−3.9		35
A. J.	.058	−.12	10	−2.8	not 14th	18
M. R.	.224	−.026	14	−1.36		19
R. V.	.339	.168	10	2.74		10
P. F.	.348	.143	10	2.77		12
E. S.	.382	.082	12	1.2		12
L. M.	.402	.3285	10	3.7	6th	8
A. S.	.43	.049	10	1.17	8th	10
F. S.	.456	.204	12	1.		12

TABLE 5

Nitrogen intake and balance in appendectomy cases

NAME	N INTAKE	N GAIN OR LOSS	DAYS UNDER STUDY	WEIGHT GAIN OR LOSS
	gm./KBW	*gm./KBW*		*kg.*
J. Mc.	.04	−.117	12	−3.73
J. B.	.082	−.223	10	−5.36
J. S.	.086	−.103	9	−.5
T. C.	.137	−.053	11	−.5
E. D.	.184	−.114	12	−.68
A. B.	.359	.09	11	.63
C. L.	.471	.15	10	2.73

followed. The achievement of a positive nitrogen balance in these two groups is of particular importance because it has been postulated that the loss of nitrogen following disease and injury is not correctable when the disease and injury occur in previously healthy individuals (23–27). This hypothesis would explain the results obtained in the gastrectomy cases on the basis that organisms having preexisting ill health do not lose as much nitrogen as do normal ones. The patients with hernia, however, except for their structural defects, were all in good health, and those with complications of the appendix had no preexisting malnutrition before they suffered their attacks of appendicitis. The ability to achieve

positive nitrogen balance in these two groups of cases, therefore, suggests that the incorrectability theory does not apply universally, at least, to many surgical conditions.

Another question arises: How can these two views as to the correctability of this nitrogen loss be reconciled? It will be seen that except for the herniotomy cases, the critical zone of nitrogen intake was much higher than that available in even the standard diet in hospitals, which contains from 11 to 20 gm. nitrogen. Since most patients undergoing

TABLE 6

Nitrogen intake and balance in unilateral and bilateral herniotomy

NAME	N INTAKE	N BALANCE PER DAY	DAYS UNDER STUDY	WEIGHT GAIN OR LOSS	E.T. IN SECONDS, PRE AND POST-OPERATIVELY
	gm./KBW				
Unilateral herniotomy:					
A. S. (1)	.059	−.111	9	−1.02	
(2)	.087	−.086	9	−1.59	
A. B.	.104	−.06	10	−1.37	273–243
O. V.	.131	−.07	10	−1.5	377–260
C. S.	.146	−.115	14	−2.17	
V. P.	.147	−.011	10	−.45	
T. M.	.156	−.053	12	−1.54	
M. K.	.17	.03	12	.45	
J. B.	.182	.011	10	−.37	500–510
W. C.	.224	−.019	12	−.81	
Mc. B.	.23	−.023	10	−.91	
H. G.	.258	.002	10	.5	372–390
P. N.	.35	.046	10	0	
W. J.	.363	.045	7	?	
M. S.	.38	.11	10	2.01	
J. F.	.45	.131	10	2.02	
D. F. (1)	.446	.127	10	2.22	
(2)	.454	.147	8		
J. D.	.53	.033	10	1.59	
Bilateral herniotomy:					
A. T.	.13	−.152	10	−2.9	
S. J.	.156	−.072	10	−2.27	
B. A.	.335	.066	8	.9	
C. L.	.373	.003	10	.3	
J. F.	.395	.004	10	−.31	

operations or injuries lose more nitrogen than this, and are unable to ingest enough in natural food to replace this loss, they would be expected to suffer a negative nitrogen balance. Since it was with natural food that most of the studies of Cuthbertson, Howard and Peters were done, this inability to achieve a positive nitrogen balance might be attributable to the low ceiling of nitrogen intake possible with natural food. The success of Werner (28) and of Lund and Taylor (29) in achieving positive nitrogen balance through high nitrogen feeding in cases of injuries seems to support this view.

PROTEIN DEFICIENCY (HYPOPROTEINIA) IN DISEASE AND INJURY

At this point it is pertinent to survey the factors contributing to hypoproteinia in the course of disease and injury. Two sets of factors are concerned: increased output and decreased intake. Increased nitrogen output may result from: (a) increased out-

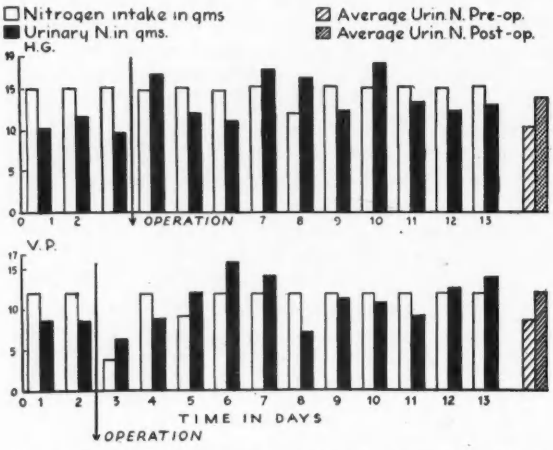

FIG. 4. *Nitrogen intake and output pre- and post-operatively in a case of unilateral inguinal herniotomy.*

TABLE 7

Nitrogen loss in burns

NAME	DATE OF INJURY OR OPERATION	DATE COLLECTED	SURFACE INVOLVED	TOTAL N EXUDED, 24 HR.*	EQUIV. IN PROTEIN*	EQUIV. IN PLASMA
			%	*gm.*	*gm.*	*cc.*
M. W. (M)	2/ 8/43	5/11/43	40	6.45+	40.31+	672
A. F. (M)	6/ 3/43	6/ 7/43	50	9.07+	56.69+	945
J. Mc (F)	7/ 1/43	7/ 7/43	30	5.15	32.19	537
		7/16/43	21	3.56	22.25	373
		7/22/43	15	2.98	18.62	310
A. B. (M)	11/10/43	11/12/43	20	1.5	9.4	150
J. W. (F)	12/21/43	1/13/44	15	7.65	47.79	796
F. W. (F)	1/15/44	1/23/44	10	1.58	9.84	164
		2/25/44	8	4.07	25.44	424
J. S. (F)	2/ 4/44	2/ 8/44	15	1.79	11.29	189

* Plus sign after figures indicates that the actual loss is greater than the figure given, some of the exudates having seeped out through the dressings into the bedding.

put in the urine, called the "catabolic loss" or "toxic loss" of nitrogen; and (b) the loss of protein in body exudations.

That there is an increased nitrogen output in the course of disease and injury has been established by various authors, notably Cuthbertson (23), Albright (30), Browne (31) and more recently Peters (27) and Howard (24–26). Figure 4, which graphically records the daily urinary output on a constant nitrogen intake for 3 days pre-operatively and 10 days post-

operatively in a typical case of unilateral herniotomy, exemplifies the increased output following an operation. It will be seen that the daily urinary nitrogen output post-operatively is higher than that pre-operatively. The averaged figures are represented in the last 2 columns, which show a daily loss of almost 3 gm. nitrogen, or over 18 gm. protein.

It also appears (Table 6) that bilateral herniotomy causes a higher nitrogen loss than unilateral, since the critical zone of intake seems to be higher in the bilateral cases, and since at comparable levels of intake the bilateral cases either suffer a higher nitrogen loss, or achieve a smaller nitrogen deposition than the unilateral cases. This would indicate that the extent of operative trauma is an important determinant of the magnitude of nitrogen loss.

Tables 7 and 8 show the magnitude of losses in the exudate in burns and in different exudative surgical conditions. In many of them the losses are of a high order, particularly in extensive denuded areas, as in burns or in large raw surfaces as a result of empyema or chest abscesses. In these two conditions the loss may be so rapid as to lead to shock or, short of shock, to rapid emaciation.

TABLE 8

Nitrogen loss in different exudative surgical conditions

NAME	DIAGNOSIS	DATE OF INJURY OR OPERATION	DATE COLLECTED	TOTAL N EXUDED 24 HR.	EQUIV. IN PROTEINS	EQUIV. IN PLASMA
				gm.	*gm.*	*cc.*
S. S.	Avulsion, peri. and back	7/7	10/23	6.37	39.81	664
R. W.	Radical mastectomy	10/25	10/26	4.26	26.65	445
			10/30	1.2	7.50	125
A. G.	Abd.-peri. resection (cancer rectum)	8/13	8/14	6.22	38.87	644
			8/16	2.07	12.97	216
O. Mc.	Abd.-peri. resection (infected) (cancer rectum)	8/9	8/18	6.97	42.46	707
			8/21	3.47	21.69	723
F. C.	Lung abscess, pyothorax		4/24	9.57–	59.8–	996
A. C.	Empyema			9.37	58.56	976
H. L.	Liver abscess (5 cm. diameter)	12/26	12/28	1.98	12.63	210

The set of factors associated with decreased intake may be subdivided into factors intrinsic and factors extrinsic to the patient. The factors intrinsic to the patient have to do with impaired appetite, impaired digestion or impaired absorption. Factors extrinsic to the patient are concerned with the inadequacy of natural food, that is, food as served from the hospital kitchen.

In the history of medicine there are many examples of the indiscriminate application of experimental results worked out on the normal subject, for use with the abnormal. One such is the use in the hospital dietary of the basic protein diet worked out for the healthy individual, as the basic diet for the convalescent. Perhaps the reason for this is the casual attitude of the average clinician toward protein nutrition, an attitude conditioned, perhaps, by the philosophy of scarcity implied in the work of Chittenden (32, 33), the proponent of the low protein intake. It is interesting here to quote Austin Flint's (34) comment on Chittenden's work: "I have read this book through. It contains much valuable material . . . but the conclusions and suggestions as to the best diet for man are extravagant, impracticable, and in their rigid application, of doubtful value, if not dangerous." While this prophecy has not proved to be strictly true for the healthy individual, it seems to be on the way to being fulfilled in the case of the sick.

The inadequacy of natural diet for the replacement of nitrogen loss in disease manifests itself in several ways. In the first place, the convalescent patient when given the regularly prepared hospital diet is usually unable to ingest enough to support nitrogen balance. This has been shown by us, and more conclusively by Rhoads (35) and by Sprinz and Ling (36). In the second place, the "basic diet" in many hospitals is often substandard. This is shown in Table 9, which represents the determined value of the nitrogen contents of the "basic or regular diet" of a public hospital for a week. It will be seen that the average nitrogen intake for the week is 9.42 gm. This is only 86 per cent of the 11 gm. nitrogen in the basic diet as recommended by Sherman (37) and later by the National Research Council (38). Finally, even if the patients are able to ingest all that is served them, and if the diets contained the pre-

scribed amounts of protein, the amount of nitrogen present in even the higher protein diet would still not be sufficient to replenish the nitrogen loss in most cases of disease and injury. Table 10 shows the theoretical nitrogen values of the various diets available in the hospital kitchen. The basic diet contains 11 gm. nitrogen; the high protein diet, less than 21 gm. nitrogen. If a patient's urinary nitrogen should rise to 18 gm., it is doubtful if the 21 gm. ingested nitrogen would be adequate to replace this loss, since it takes much more than one gram of ingested protein to replace one gram of protein lost. And this does not take into consideration the loss in exudates in some cases of open wounds.

TABLE 9

Ward diet

May 5–12, 1943

	Total Nitrogen gm.
Wednesday	6.245
Thursday	14.827
Friday	8.189
Saturday	5.211
Sunday	8.6846
Monday	10.338
Tuesday	12.484
Total N for week	65.9786
Average N per day	9.42

TABLE 10

Nitrogen values of various diets

	PROTEIN	TOTAL NITROGEN	NITROGEN
	gm.	*gm.*	*gm./KBW*
"Basic"	70	11.2	.186
"High Protein" (1)	120	19.2	.32
(2)	130	20.8	.346
"Tolerance"*	192	30.7	.512

* By tolerance is meant the maximum amount of protein that can be tolerated.

Thus there is a gap between the magnitude of protein loss in disease and the possibility of replacing it with natural food. The introduction of protein hydrolysates in therapeutics promises to bridge this gap.

It is not within the purview of this paper to discuss the chemical aspects of protein hydrolysates, although later some consideration will be devoted to preliminary standards for the control of this comparatively new product. Suffice it to say here that these hydrolysates possess the following advantages over natural food as nutriment for the convalescent: they have greater solubility and can therefore be given in smaller bulk, require little digestive effort, are more readily absorbed, and seem to be better tolerated by a diseased gastro-intestinal mucosa.

Because of the above properties of the hydrolysates, it is now possible to use them either alone or in conjunction with natural food to supply the increased nitrogen requirements of the convalescent patient, and in amounts much higher than has been possible heretofore. This new level of feeding has been termed by us *hyperalimentation*.

HYPERALIMENTATION

Apart from its employment in such self-limited conditions as the operative conditions described above, hyperalimentation has been used in three conditions known to be associated with varying degrees of malnutrition, and with cases of clinical malnutrition itself.

Burns. The treatment of malnutrition in severe cases of burns by hyperalimentation with protein hydrolysates has been dealt with in a previous report (10). In summary it may be said that an intake as high as 1 gm. nitrogen per kilogram body weight has been given, resulting in prevention of wasting. This work has been confirmed by Lund (39), also by Evans (40) who used meat powder. Table 11 represents 3 cases treated nutritionally with Amigen.

TABLE 11

Cases of second degree burns treated with protein hydrolysates

NAME	ORIGINAL BODY WEIGHT	AREA BURNED	TOTAL DAILY NITROGEN INTAKE	NITROGEN	EQUIV. IN PLASMA	REMARKS
	kg.	*%*	*gm.*	*gm./KBW*	*cc.*	
J. C.	56.8	10	35	0.62	3644	sufficient
J. McN.	55.45	30	24	0.43	2500	insufficient
			25.6	0.46	2650	insufficient
			33.6	0.61	3500	maintenance
			42.2	0.76	4400	rapid gain
M. W.	65.9	50	27.44	0.42	4570	insufficient
			36	0.55	3750	maintenance
			49.5	0.75	5160	slight gain
			66	1.00	6875	rapid gain

Peptic Ulcer. Thirty cases of this malady were subjected to the hyperalimentation regimen by means of protein hydrolysates, as reported elsewhere (41). This treatment, the cause, and the possible rationale may be summarized as follows:

Type of cases: 17 duodenal ulcer; 5 duodenal and gastric ulcer; 6 gastric ulcer; and 2 gastrojejunal ulcer. Of these 30 cases 14 were diagnosed as "intractable," 6 with retention roentgenologically (20 to 100 per cent), and 6 with frank hemorrhage.

Treatment comprised the administration of 0.6 gm. nitrogen per kilogram body weight (5 each of Amigen and dextrimaltose) per day, suspended in water, and divided into 8 to 9 two-hourly feedings. Feedings were continued for 2 to 3 weeks, depending on response. No antacids or antispasmodics were

used. Amphojel (4 cc.) was permitted once or twice a day only when diarrhea was present. A full complement of vitamins was also given.

Results. Pain and distress were relieved in 24 to 48 hr.; vomiting, immediately, or within 48 hr. There was evidence of rapid roentgenologic healing. Positive nitrogen balance (average 10 to 16 gm.) was established in the first 10 days. Rapid gain in strength, weight and morale developed. Treatment, however, does not prevent recurrence of symptoms, once the old dietary habits are resumed.

Rationale. It is postulated that two factors may be responsible for the results obtained: 1. The neutralizing power of protein hydrolysates for hyperacidity (*see* Table 12). 2. The high nutritive value of the feedings, which furnish the body with the building material for healing the ulcer defect,

TABLE 12

Neutralizing power of protein hydrolysates for hyperacidity

TIME	*p*H	FREE ACIDITY	TOTAL ACIDITY
10:00	2.05	47.0	65.5
10:10	1.92	59.0	78.5
Feeding: 10:10			
10:45	4.21	—	205.5
11:00	4.24	—	269.5
11:15	4.15	—	245.5
11:30	4.07	—	305.0
11:45	4.22	—	298.0
12:00	4.18	—	286.5
12:15	3.68	3.0	212.5
12:30	3.01	34.5	191.5
Amigen: 51.1 gm. Dextrimaltose: 58.6 gm. Formula:	5.22	—	456.0

and for making up for the protein deficiency from which many of these patients suffer.

Specific Results in Pulmonary Tuberculosis. The preliminary results in two cases (K. P. and C. Y., respectively) under the supervision of Drs. J. Burns Amberson and J. Jones of the Bellevue Hospital Chest Service, are summarized in Tables 13 and 14.

K. P. was a 23-year-old white patient admitted December 10, 1944 with x-ray diagnosis of ulcero-fibrous tuberculous process of the right side with extremely large fluid-containing cavity in the apex and first interspace. Admission weight was 160 lb. (63.64 kg.). The temperature on admission was 104°F., but after thoracentesis it gradually came down to normal. The patient was started on the hyperalimentation regimen March 26, 1945. The nitrogen balance was followed for 23 days. As will be seen from the table, during these 23 days he was taking .72 gm. nitrogen per kilogram body weight. Nitrogen retention, however, varied from 9.33 to 51.65 gm. for the 3-day period. The body weight first fell and then rose until at almost the end of this 23-day period the patient was only 1 kg. heavier than his initial weight. Total nitrogen retention during this period was 215.34 gm. nitrogen which should theoretically correspond to over 6 kg. weight gain. On continuing the hyperalimentation regimen, weight gradually rose until on July 11 it was 15.79 kg. over initial weight. During this time the patient felt much better, stronger, and his morale was considerably higher. Sedimentation rate was 80 min. at the start of the regimen and continued for 3 weeks, but dropped to 22 min. 57 days after the regimen was started. The tuberculous lesion, however, whether judged clinically or radiologically, showed no significant difference.

C. Y., a 16-year-old Negro, followed a similar course. Roentgenologically, he had "scattered fine exudative infiltration from apex to the right third rib, L.S. There is extensive confluent exudation from this tissue to R5 anterior and probable cavity at 2nd interspace." As will be seen from Table 13, nitrogen retention was of a higher magnitude than K. P.'s, averaging over 10 gm. daily for the first 3-day period, and rising to as high as almost 34 gm. daily for the sixth 3-day period. Total intake during the 23-day period of study was 1004.2 gm. nitrogen, or an average of 43.7 gm. nitrogen (273 gm. protein) per day, or .807 gm. nitrogen per kilogram body weight. A preliminary fall in weight was registered for the first 12 days in the face

TABLE 13

Nitrogen balance data on case of pulmonary tuberculosis (K.P.)

DATE	NITROGEN INTAKE	NITROGEN BALANCE	P.P.	HEM.	WEIGHT	P.V.	T.B.V.	SED.R.
	gm.	*gm.*	*gm. %*		*kg.*	*cc.*	*cc.*	
Initial					59.55			
3/26–29	108	29.86	6.74	38	58.55	50.5	81.5	80
3/29–4/1	108	33.9						
4/1–4/4	108	9.33	6.86	47	58.18			
4/4–7	111	23.12			58.41			
4/7–10	135	51.65	6.96	41	60	54.5	92	
4/10–13	156	30.28			60.8			
4/13–16	150	37.23			60.95			80
4/17–18	110	32.30	7.07	44				
6/6					72.27			22
6/21					73.41			
7/11					75.34			

of a markedly positive balance. Total nitrogen retention during this time was 439 gm. At the end of the 23-day period, body weight was 4.31 kg. over the initial weight. Sedimentation rate dropped from an initial of 73 min. on March 28 to 5 and 10 on June 6 and 9, respectively. The patient's morale was also improved and he felt better and stronger.

On continuation of this high intake, weight was 65.58 kg. on June 8—11.13 kg. over initial weight. The lesion, however, showed no significant improvement radiologically.

The electrophoretic pattern of the plasma proteins is shown in Table 15. It will be seen that in both there seems to be a slight tendency for the total plasma protein and total blood albumin to rise.

In the experimental use of this regimen for pulmonary tuberculosis, there is a maximum and a minimum objective. The maximum objective is that this regimen might by itself cause a dramatic improvement in the disease picture. It can now be said that in 3½ months, fairly well advanced tuberculosis shows no significant improvement in the

lesion, in the face of signs of general improvement and of a weight gain, the magnitude of which is considered unusual in this disease. The minimum objective is that this regimen might be a useful adjuvant in the management of pulmonary tuberculosis, that is, in the nutritional therapy of the disease. Here the results are more promising. One could speculate on a combination of this regimen with a specific antibiotic, or as a preparatory measure for operative therapy. However, because of the small number of cases so far studied, it still remains to be shown how useful an adjuvant this regimen will prove to be.

TABLE 14

Nitrogen balance data on case of pulmonary tuberculosis (C. Y.)

DATE	NITROGEN INTAKE	NITROGEN BALANCE	P.P.	HEM.	WEIGHT	P.V.	T.B.V.	SED.R.
	gm.	*gm.*	*gm. %*		*kg.*	*cc.*	*cc.*	
Initial			7.48	44	54.55	45	81.5	
3/27–29	108	74.08			53.18			73
3/29–4/1	108	58.08						
4/1–4	108	40.62	7.17	53	54.32			
4/4–7	112	10.33			54.21			
4/7–10	117	69.97	7.81	45	55.11			
4/10–13	164	51.89	8.08	47	56.02	46.4	88.2	
4/13–16	168	79.15			58.52			
4/16–18	113	54.88	7.72	49				
(For plasma Tiselius pattern, *see* Table 15.)								
4/23			8.34	51	58.86	41	90	25
6/6								6
6/9					65.16			10
7/11					66.36			

TABLE 15

Electrophoretic pattern of plasma proteins in tuberculous patients

NAME	DATE	T.P.P.	ALBUMIN	TOTAL ALBUMIN	GLOBULIN	TOTAL GLOBULIN	OTHER GLOBULIN	TOTAL OTHER GLOBULIN
			%		%		%	
K. P.	4/17/45	241	42	101	16	38.5	42	101
	4/25	244	46	112	16	39	38	93
	5/10	248	46	114.1	19	47	35	87
C. Y.	4/17/45	233	42	98	27	63	31	72
	4/25	231	46	106	28	65	26	60

Postoperative Malnutrition. The last series of cases may be called cases of clinical malnutrition, of which 2 are here reported in Table 16.

D. R. lost 22.11 kg. in 4 months as a result of a poorly functioning stomach reaction. Plasma protein level was 5.56 gm. per cent. On .75 grams nitrogen per kilogram body weight for 16 days he retained a daily average of .35 gm. per kilogram. After the first week of this regimen, body weight dropped to 60.2 kg., representing a loss of 2.6 kg. The hyperalimentation was continued for 4 weeks, after which weight was 76.25 kg., plasma protein 6.5 gm. per cent. The patient felt well and strong, his ergographic performance had tripled the initial value, he felt ambitious and wanted to resume work. It should be noted that rehabilitation of this initially weakened and emaciated patient took only 4 weeks, where ordinarily it would take at least the same number of months.

G. D., a 23-year-old male Negro suffered from abdominal pains and gas for 5 mo. He was edematous on admission. He was operated upon and relieved of chronic intestinal obstruction. Two weeks after operation the protein status was as shown in Table 16. The patient was put on protein hydrolysate (Squibb) and dextrimaltose, .883 gm. nitrogen and 40 calories per kilogram body weight. This was fed as the exclusive source of nitrogen for the first 11 days, during which time as much as .638 gm. nitrogen per day was retained. The blood proteins went from 5.36 to 6.73 gm. per cent, and the body weight increased from 55.09 to 61.82 kg. After this period, ordinary foods were added to the diet in gradually increasing amounts. After 30 days on this hyperalimentation regimen the patient had gained 15 kg., and felt so well that he wanted to go to work. Again this period is at least one fourth to one fifth that possible with the usual high calorie, high protein diet.

TABLE 16

Two cases of post-operative malnutrition

	B.* WEIGHT	PRESENT WEIGHT	DAILY N INTAKE	DAILY N GAIN	P.P.
	kg.	*kg.*	*gm./ KBW*	*gm./ KBW*	*gm. %*
D. R., 49, poorly functioning pclya, 3 months	85.91				
6/10/45		63.8			5.56
6/10/45			.75	.35	
6/17		60.2			6.2
6/26		68.5			6.7
6/26–7/17			.75	.22	
7/7		76.25			6.5
G. D., 23, undiagnosed chronic intestinal obstruction, 6½ months. Post-operative data after relief of obstruction:	87.73				
3/27/45 (initial)		54.8	.85	.35	
4/18/45 (final)		59.5			

*B. weight = best weight as selected by patient.

Before concluding this section, it may be worthwhile to discuss the preliminary loss of weight undergone by K. P., C. Y., and D. R. during the period when nitrogen balance was markedly positive. Lyons (42) showed that those with war wounds whose cases he studied, in addition to malnutrition, also had a large extracellular fluid volume. This has been confirmed by Sprinz and Ling (43). If this increase in extracellular fluids occurs as a result of protein deficiency, as it possibly does, the deposition of nitrogen would cause the elimination of water, and the weight gain expected to result from protein dep-

osition would be counterbalanced by a large loss of water from the interstitial fluid compartment. This tentative interpretation would imply, in turn, that the actual weight of a person losing protein is deceptive and does not represent the actual tissue loss, as water is being retained; and, conversely, that the weight change in the hypoproteinic patient is deceptive in the reverse sense.

THE USE OF PROTEIN HYDROLYSATES

It has been pointed out in the previous section that the amount of nitrogen in natural food, that is, the food that is prepared in the hospital kitchen, is not adequate in supporting nitrogen balance in convalescence and that the higher requirements of nitrogen must be met by the administration of protein hydrolysates or amino acid mixtures. At this point it will be pertinent to discuss the subject of protein hydrolysates—not from the chemical, but the clinical and nutritional point of view.

Cox and his associates (44, 45) were first to introduce a protein hydrolysate in clinically applicable form. Elman (46) pioneered in the field of intravenous alimentation using this preparation, and Shohl (47) introduced the oral use of this preparation into pediatric practice.

There are two main forms of protein hydrolysates: the intravenous and the oral. The requirements common to both will first be set forth:

1. Nitrogen balance and biological value: Both forms must have been shown to support nitrogen balance in man. Naturally, the higher the biological value, the better. For this test we have used patients subjected to inguinal herniotomy, of which there are many, but only those who are well-nourished. The operative trauma is fairly well standardized. Using Amigen as standard, we have studied two other products and have found one which has at least the same biological value, and another with almost half that value. Our results have checked fairly closely with those of others (48) who used the plasmaphoresis technique in dogs.

2. Percentage of total amino nitrogen: This is important, particularly for the intravenous form, as it defines the extent of the hydrolysis and percentage of protein nitrogen. The higher the concentration of nitrogen, the less bulk need be given.

3. It would be desirable, also, for the manufacturers to furnish the clinical investigators with the amino acid pattern of their products. This will enable the investigators to begin studying the specific amino acid needs of disease, a research trend which is beginning to emerge.

Requirements for the Intravenous Form.

1. It must be sterile, non-pyrogenic, non-antigenic.
2. The solution must be clear.
3. The *p*H must not be lower than 5, in order not to produce thrombophlebitis which not only obliterates veins but also has been known to cause septicemia.
4. It must be injectable in adequate amounts without producing nausea, vomiting, or other unpleasant reactions.
5. The container should be such that the solution can be given directly without transfer. Amino acids are rich bacterial nutrients, and once contaminated, the bacteria multiply very rapidly, introducing not only pyrogen but also living bacteria into the blood stream. A minor point is that the container should be of clear glass.

The disadvantages of the intravenous form are the inconvenience in administration and the difficulty of giving enough to supply the caloric and nitrogen needs of convalescence. However, in cases in which the gastro-intestinal tract cannot tolerate feedings, they can be life-saving. Moreover, the introduction of non-irritant solutions of 8 to 10 per cent, if not entirely adequate calorically, will meet the nitrogen requirements of hyperalimentation.

Requirements for the Oral Form. The particular requirements of the oral form may be discussed under the following tentative headings:

1. Taste. Protein hydrolysates have a peculiar taste—liked by a few, tolerable to others, and objectionable to still others. Indeed, it may be said that it is the taste which is the greatest barrier to a universal use of these products. The palatability varied with various preparations, although it can generally be stated that the more complete hydrolysates are more objectionable than the partial hydrolysates.

2. Solubility and suspensibility. The products must be easily soluble so that they may be given in small bulk. The more complete the hydrolysate, the more soluble. If solubility cannot be completely obtained, the product should be easily suspensible, so that hyperalimentation can be achieved without giving too large a bulk.

3. Bacterial count. As far as possible, the product should be bacteria-free. If bacterial contamination is present, it should not number over 200 per gram of the digest. A larger count produces a fetid odor, a nauseating taste and causes nausea, vomiting, gastro-intestinal distress and diarrhea when product is administered.

4. Untoward symptoms. Must not cause distension, distress, diarrhea, vomiting—when given in adequate doses. Generally speaking, preference must be given to products which can comfortably be given in large quantities. We have given protein hydrolysates in amounts corresponding to 1.25 gm. nitrogen per kilogram body weight. The sodium chloride content must be low enough (preferably below 3%) so that a hyperalimentation formula can be given without an overdose of salt. Preferably, too, the other mineral contents should approach those in the normal diet. Because of the use of the oral form

of the hydrolysates in the treatment of peptic ulcer, it is desirable to know the neutralizing power of each preparation.

PROCESSED FOODS AND PARTIAL HYDROLYSATES

A slightly hydrolyzed and slightly soluble product of lactalbumin has been introduced (49), which has been shown to be able even to support nitrogen balance (50) and to be capable of being given in hyperalimentation levels with favorable results in cases of malnutrition as a result of war wounds. This group of investigators at the Halloran Hospital (50) have also shown that even dried powdered milk reinforced with fresh eggs can be given at hyperalimentation levels, as has also been shown with powdered meat (40). These preparations possess an advantage over the more complete hydrolysates in that they are much more palatable and less expensive.

We thus have a "spectrum" of products of different stages of degradation, from whole food, processed food and slightly hydrolyzed products to pure amino acids, now at our disposal for nutrition of the sick and the convalescent. The research task is to find out what stage of degradation is more suitable for each type of case.

While palatability and expense are important, it has not been shown whether the insoluble forms can do all the things that the soluble forms can do. Small bulk is important in some cases, and here the insoluble forms possess a distinct disadvantage. The non-necessity of digestive effort is an important factor in patients with gastro-intestinal disease. Thirdly, the possibility of high nitrogen elimination causing renal injury, as has been shown by Addis *et al.* (51) on rats, may be an important consideration, and here again, forms which can be chemically concentrated so that every gram of nitrogen given is effective, would spare the kidneys more than the insoluble forms in which the nitrogen given (amino acid pattern) is indiscriminate. Then, with the faint beginnings of the study of the specific amino acid requirements in different diseases, as suggested by the work of Croft and Peters (52) on rats, Eddy (53) in carbon tetrachloride poisoning, and of Holt *et al.* (54), preparations in which the amino acid patterns can be more easily modified seem to be the more promising.

Finally, the time factor of the restoration of the normal protein status must be taken into consideration. It makes a great difference whether the restoration of a malnourished person to working form takes place in 1 month or in 5 months. The record of Amigen and Squibb's hydrolysate in this respect in the two cases of clinical nutrition reported are examples which are certainly striking enough to challenge similar performances with other preparations.

GENERAL COMMENTS

The study of nitrogen loss in disease and in injury, and of measures to circumvent it, holds the bright promise that convalescence from disease and injury can be materially shortened, resulting in the saving of innumerable man-hours of human endeavor. It is true that protein hydrolysates, which must play the major part here in nitrogen replacement, because of their unpalatability cannot at present be universally employed. Yet the matter is of such import as to challenge the ingenuity of chemists constantly to strive for improvement. It can safely be predicted, on the basis of their noted record of ingenuity, that American chemists may be depended upon to do this in short order.

Lastly, at this juncture where there is worldwide, acute shortage of proteins for human consumption, the possibility arises that scrap and waste proteins may be made available as a supplement for human and animal nutrition by chemical processing. It appears to the writer that the protein hydrolysate industry, more than any other, is better prepared to meet this humanitarian challenge.

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Doctoral Degrees. The degree of doctor is now conferred in so many areas of learning that the result is confusion. The conferring of the doctoral degree is in need of a thorough house cleaning. The degree of doctor of philosophy (Ph.D.) is granted for 3 years of full time study and examination and the preparation of a thesis following the bachelor's degree. The degree of doctor of science (D.Sc.) is granted for an identical program when the major part of the work is in science. "Many times in education, history, literature, economics, sociology and natural sciences the Ph.D. seems to be granted for meeting a standard of mediocrity." Some of the titles of theses have become the butt of humorous remarks, a typical example being a thesis on "The Length of Sentences in Spenser." The conclusion of this important thesis, which was 300 pages long, was that the sentences in Spenser were of 3 types—long, short, and those which could not accurately be described as either "long" or "short." Educational authorities might well consider the desirability of some standardization in this area so that the degree of doctor, regardless of the field of learning in which it is applied, will have real significance. Furthermore, the public should be able to determine from a title the actual qualifications of the man who adorns himself with it. Finally, the economists who devote themselves to propaganda for revolutionizing medical care persistently trade on their doctor of philosophy degrees and thus perpetrate a fraud on the public, who take it for granted that these "doctors" are physicians.—*J.A.M.A. 129: 1168, 1945.*

Filling the Special Diet Prescription: High Protein Diets[1]

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WITH the increased realization of the importance of protein in therapy, there has been an increase in the number and kind of high protein diets ordered by doctors. These range from a high protein diet (approximately 125 gm.) with no animal tissue, to one of 350 gm. protein with high animal-protein foods permitted. Since many of the patients slated for these diets are hepatitis cases, there is an additional modification, that of the fat content of the diet, to be considered.

In order to meet the requirements of these prescriptions, we have devised a considerable number of formulas for supplementary feedings using various protein hydrolysates, namely, Casec, Amigen and Aminoids, also dry skim milk. Because of limited space and personnel, we have been obliged to concentrate our efforts on evolving beverage mixtures plus a very few simply prepared desserts. It is possible, however, to incorporate some of the protein hydrolysates in muffins, cakes, cookies, etc. to the end that the number of between-meal feedings can be held to a minimum.

HIGH PROTEIN SUPPLEMENTARY FEEDINGS USING CASEC

Where no limitation has been placed on the fat content of the diet, we have given a feeding originally devised for use in the Canadian Army. Each pint feeding of the formula, which contains whole milk, eggs, sugar, Casec, ice cream, cocoa, vanilla and lactose, has a value of 41 gm. protein. The mixture resembles a rich, chocolate milk shake as to consistency and taste. It has been generally satisfactory except in those instances where the richness of the mixture has been a drawback.

For patients whose digestive system may not tolerate such a sweet mixture as the above and for those who require a lower fat content, we have devised two other feedings using Casec:

¼% Fat Casec Feeding (2 feedings):

Skim milk	375 gm.
Egg, whole	1
Casec	30 gm.
Cocoa	5 gm.
Lactose	10 gm.
Sugar	15 gm.
Vanilla to taste	

Value of 1 feeding: carbo. 23 gm., prot. 23 gm., fat 4 gm., cal. 220.

1½% Fat Casec Feeding (6 feedings):

Skim milk	960 gm.
Egg, whole	1
Egg whites	10
Casec	60 gm.
Lactose	40 gm.
Sugar	80 gm.
Orange juice	120 gm.
Egg coloring	

Value of 1 feeding: carbo. 30 gm., prot. 23 gm., fat 1.5 gm., cal. 225.

HIGH PROTEIN SUPPLEMENTARY FEEDINGS USING AMIGEN

The greatest obstacle to be overcome in giving Amigen orally is to disguise the taste and the odor. So far we have been unable to accomplish this completely. However, the following formulas, in amounts sufficient for one feeding, have been found to be acceptable:

Grape juice	100 gm.
Lemon juice	10 gm.
Sugar	10 gm.
Amigen	10 gm.

Carbo. 26 gm., prot. 10 gm., fat 0, cal. 145.

Ice cream	60 gm.
Milk	100 gm.
Amigen	10 gm.
Chocolate syrup	50 gm.

Carbo. 47 gm., prot. 18 gm., fat 14 gm., cal. 390.

[1] Received for publication September 18, 1945. The author acknowledges the assistance and encouragement of Lt. Col. Paul L. Shallenberger, M.C., A.U.S.

Fresh orange juice ..... 200 gm.
Fresh lemon juice ..... 10 gm.
Amigen ..... 10 gm.
Carbo. 27 gm., prot. 11 gm., fat 0, cal. 150.

Milk, whole ..... 150 gm.
Chocolate syrup ..... 50 gm.
Amigen ..... 10 gm.
Carbo. 36 gm., prot. 17.5 gm., fat 8.5 gm., cal. 290.

Baked Custard:
Egg 1
Sugar ..... 10 gm.
Milk ..... 120 gm.
Amigen ..... 5 gm.
Vanilla, nutmeg, salt
Carbo. 16 gm., prot. 15 gm., fat 9.5 gm., cal. 210.

Junket:
Milk ..... 120 gm.
Junket powder ..... 11 gm.
Amigen ..... 5 gm.
Carbo. 17 gm., prot. 9 gm., fat 5 gm., cal. 150.

On the whole, those formulas which are flavored with chocolate and also well-chilled are the most palatable.

HIGH PROTEIN SUPPLEMENTARY FEEDINGS USING AMINOIDS

The same problem of disguising taste and odor has to be met here as in the use of Amigen. It was found that Aminoids combines better with milk than with fruit juices, although some patients will accept the latter combination occasionally. Each of the following formulas makes one feeding:

Whole milk ..... 200 gm.
Aminoids ..... 20 gm.
Carbo. 17 gm., prot. 15.5 gm., fat 8 gm., cal. 200.

Skim milk ..... 200 gm.
Aminoids ..... 15 gm.
Carbo. 15 gm., prot. 15 gm., fat 0.6 gm., cal. 85.

Whole milk ..... 180 gm.
Egg, whole 1
Sugar ..... 10 gm.
Aminoids ..... 15 gm.
Carbo. 24 gm., prot. 19 gm., fat 12.5 gm., cal. 285.

Pineapple juice ..... 200 gm.
Aminoids ..... 10 gm.
Carbo. 29 gm., prot. 5 gm., fat 0.7 gm., cal. 140.

Cooked oatmeal ..... 150 gm.
Aminoids ..... 10 gm.
(Serve hot with cream or milk)
Carbo. 15.5 gm., prot. 7.5 gm., fat 1.5 gm., cal. 105.

Baked Custard:
Egg 1
Sugar ..... 10 gm.
Whole milk ..... 120 gm.
Aminoids ..... 10 gm.
Carbo. 19.5 gm., prot. 15 gm., fat 10 gm., cal. 230.

Low Fat Custard:
Substitute skim milk for whole in preceding recipe.
Carbo. 19.5 gm., prot. 15.5 gm., fat 5.5 gm., cal. 190.

HIGH PROTEIN SUPPLEMENTARY FEEDINGS USING DRY SKIM MILK

In cases where the "predigested" protein supplements have not been well tolerated, we have been successful in attaining a high protein intake with the use of the following formulas using dry skim milk as the fortifying factor:

Low Fat Dry Skim Milk Mixtures

Basic Mixture:
Dry skim milk ..... 45 gm.
Water ..... 170 cc.
Carbo. 17.5 gm., prot. 16 gm., fat 1 gm., cal. 140.

Mixture should be brought to the boiling point and then allowed to cool. This will then weigh about 200 gm.

Basic mixture ..... 180 gm.
Mashed bananas ..... 60 gm.
Sugar ..... 5 gm.
Carbo. 33 gm., prot. 15 gm., fat 1 gm., cal. 200.

Basic mixture ..... 200 gm.
Aminoids ..... 20 gm.
Carbo. 24 gm., prot. 25 gm., fat 1 gm., cal. 205.

Buttermilk ..... 200 gm.
Dry skim milk ..... 30 gm.
Carbo. 21.5 gm., prot. 17.5 gm., fat 1.5 gm., cal. 160.

Mock Eggnog:
Basic mixture ..... 200 gm.
Sugar ..... 5 gm.
Vanilla, nutmeg, egg coloring.
Carbo. 22 gm., prot. 16 gm., fat 1 gm., cal. 160.

Frozen Sherbet:
Dry skim milk ..... 30 gm.
Pineapple juice ..... 120 gm.

Fresh lemon juice ..... 15 gm.
Sugar ..... 30 gm.
Carbo. 58.5 gm., prot. 11 gm., fat 1 gm., cal. 285.

Normal Fat Dry Skim Milk Mixtures

Whole milk ..... 200 gm.
Dry skim milk ..... 30 gm.
Chocolate syrup ..... 30 gm.
Carbo. 33 gm., prot. 17 gm., fat 9.5 gm., cal. 285.

Whole milk ..... 200 gm.
Dry skim milk ..... 45 gm.
Carbo. 27.5 gm., prot. 22 gm., fat 9 gm., cal. 280.

Whole milk ..... 160 gm.
Whole egg ..... ½
Ice cream ..... 20 gm.
Dry skim milk ..... 30 gm.
Carbo. 24 gm., prot. 20 gm., fat 12 gm., cal. 285.

Vanilla Ice Cream:
Whole milk ..... 120 gm.
Dry skim milk ..... 30 gm.
Egg, whole ..... ½
Egg, white ..... ½
Sugar ..... 30 gm.
Vanilla to taste
Carbo. 47.5 gm., prot. 20 gm., fat 8 gm., cal. 340.

HIGH PROTEIN DIETS

The majority of our patients who have been placed on the high protein diets have had working diagnoses of malnutrition or hepatitis, or are expected to require a prolonged convalescence. The diets ordered for them fall roughly into four groups: high protein, no animal tissue; high protein, low animal tissue; high protein, high caloric; high protein, low fat.

High Protein, No Animal Tissue, Diets. In certain cases of acute hepatitis a protein diet with no animal tissue has been requested. This is based on the work of many investigators in the field who believe that there is a so-called water-soluble factor in animal protein.[2] This factor has neither been isolated nor identified, but it is said to be hepatoxic and nephrotoxic because animals subjected to artificial hepatitis will survive when fed animal tissue protein after a water extraction has been made. They will not survive in such a high percentage of instances when they are fed whole meat. This, of course, refers only to protein in hepatitis. Since the present school of thought seems to be swinging away from this viewpoint concerning meat protein foods, the following regime is used only occasionally and for short periods, after which the dietitian is allowed to increase the meat portion of the protein:

Foods, Three Meals Daily:

Eggs 6
Butter ..... 4 pats (10 gm. each)
Milk ..... 1¼ qt. (includes soups and creamed dishes)
Cream ..... 1 oz.
Cheese, cottage ..... 2 oz.
Bread ..... 3 slices
Cereal ..... 1 serving (15 gm.—dry)
Fruit, 12% ..... 3 servings (100 gm. each)
Potato (or substitute) .. 2 servings (100 gm. each)
Vegetables ..... 3 servings (100 gm. each)
Food value of 3 meals: carbo. 220 gm., prot. 105 gm., fat 140 gm., cal. 2550.

Nourishments

Between-Meal
Eggnog ..... 1 pint
Fruit juice with egg white ..... ½ pint
Food value of the 2 between-meal nourishments: carbo. 58, prot. 20, fat 26, cal. 546.
Total value per day: Carbo. 278 gm., prot. 125 gm., fat 166 gm., cal. 3100.

It will be noted that none of the special supplementary formulas have been listed here for between-meal feedings. At this stage the patient is often a definite feeding problem and it frequently seems best to limit the supplementary feedings to the simpler mixtures which are more familiar to him. When

[2] *See* original article by A. C. Ivy, *Quarterly Bulletin* of Northwestern University Medical School, spring quarter, 1942:

"The quality of the protein food fed must not be disregarded. Although meat protein per se is a good source, meat, because of its extractives, is injurious. This is borne out by the following evidence: Chloroform is more toxic when given to animals kept on a meat diet alone than on a carbohydrate diet." (Opil and Alford: J. Exper. Med. 21: 1, 1915; J. A. M. A. 62: 895, 1914.)

"Meat powder is less effective than casein in preventing fatty infiltration." (MacLean, Ridout and Best: Brit. J. Exper. Path. 18: 345, 1937.)

"Casein protects against selenium, whereas gelatin gives no protection." (Gortner: J. Nutrition 19: 105, 1940; Maxon: South Dakota Agric. Exper. Sta. Bull. 311, 1937, p. 50; Smith: Pub. Health Rep. 54: 1441, 1937; Dubois, Olson and Maxon: J. Nutrition 19: 447, 1940; Fischler: Physiology and Pathology of the Liver. Berlin, 1925.)

"A high carbohydrate diet with ample protein gives more protection against carbon tetrachloride than a high protein diet." (Bollmann, Butt and Snell: J. A. M. A. 115: 1087, 1940.)

"The fatty liver associated with fibrosis of the pancreas does not occur if meat minus its water soluble extractives is fed." (Ralli and Rubin: Proc. Soc. Exper. Biol. & Med. 43: 601, 1940.)

"The Eck fistula dog, in which the portal blood is shunted into the inferior vena cava and much hepatic atrophy exists, becomes intoxicated on meat or its extractives, but not on a diet of milk, bread, cereals, glucose, vitamin supplements and cartilage." (Bollmann and Mann: Ergebn. Physiol. 38: 445, 1936; Crandall, Roberts and Gibbs: Proc. Soc. Exper. Biol. & Med. 29: 1082, 1932; *Ibid.* 30: 704, 1933.)

possible, however, the fortified formulas should be substituted in order to obtain a higher protein intake.

High Protein, Low Animal Tissue Diets. When some animal tissue may be used in restricted amounts, the doctor indicates the amount of protein in grams to be given in the form of meat. For example, if a patient is permitted 30 gm. protein of animal tissue origin, approximately 3 oz. lean meat, medium done, is substituted for four of the eggs in the above diet.

High Protein, High Calorie Diets. The majority of the patients on this diet are ambulatory and eat their meals in the mess hall. Since the regular hospital diet contains approximately 120 gm. protein, four or five supplementary feedings given on the ward between meals have proved a satisfactory method of ensuring a high protein intake. These between-meal feedings may consist of milk shakes, eggnogs, ice cream and meat sandwiches, or may be composed of some of the high protein supplementary formulas. The doctor indicates which regime he prefers for the individual patient.

High Protein, Low Fat Diets. With the increasing number of jaundice and hepatitis cases being admitted to the hospital, we found it necessary to have a basic, high protein, low fat diet on which to base any desired modifications. The diet listed below, containing 250 gm. protein and 50 gm. fat, proved the most satisfactory. The supplementary feedings as listed are arbitrary, of course, as the doctor will frequently indicate the type of protein hydrolysate he prefers for the individual patient or the patient may refuse one type of supplement and accept another.

Foods, Three Meals Daily:

Lean meat	2 servings (120 gm. each)
Eggs	2
Skim milk	½ pint (240 gm.)
Bread	6 slices (30 gm.)
Cereal	1 serving (15 gm.—dry)
Jelly or jam	3 servings (30 gm. each)
Potato (or substitute)	2 servings (100 gm. each)
Vegetable, 9%	2 servings (100 gm. each)
Vegetable, 3%	2 servings (100 gm. each)
Fruit, 12%	3 servings (150 gm. each)

Food value of 3 meals: carbo. 300 gm., prot. 125 gm., fat 33 gm., cal. 1997.

Between-Meal Nourishments:[3]

4% Casec	4 feedings
Low fat dry skim milk	2 feedings

Food value of the 6 between-meal nourishments: Carbo. 136, prot. 124, fat 18, cal. 1202.

Total value per day: carbo. 436 gm., prot. 249 gm., fat 51 gm., cal. 3200.

This diet is easily adapted to meet any modifications as they arise. For example, one patient who was permitted 100 gm. fat instead of the 50 indicated was also able to consume a larger than normal serving of meat. Therefore he received the above diet with 250 gm. meat twice daily and only two between-meal feedings. The extra fat permitted was made up by means of butter and cream.

In several instances an even higher protein intake has been requested. Several patients have taken a diet containing 350 gm. protein, but for short periods only. This diet was attained by giving the basic diet as outlined for the meals, using 200 gm. meat twice a day instead of the 120 gm. and eight of the 1½ per cent Casec feedings with and between meals, instead of the feedings listed above. The resultant intake for the day was: carbohydrate 550 gm., protein 355 gm., fat 54 gm., calories 4100.

Since no diet as written is of any use unless actually consumed, it is obvious that every care must be taken to ensure attractive, tasty foods served at the proper temperature. This applies not only to the meals but also the between-meal nourishments. To persuade the patient whose digestion may already be upset that it is to his advantage to "down" quantities of unfamiliar tasting beverages, calls for watchfulness and patience on the part of the dietitian or nurse who is directly responsible for his food. Unless otherwise directed by the doctor, a variety of supplementary formulas should be presented to the patient at first in order to discover those he likes best. In other words, to obtain optimum intake, these feedings should be "tailor-made" for the individual patient wherever possible.

[3] Refer to lists of formulas earlier in the article.

Army Food Influences Soldiers' Preferences

Col. Edwin J. Fitzpatrick, who served with the Quartermaster Corps in Germany as chief of subsistence for the occupation forces, is quoted in the *Food Field Reporter*, December 24, as stating that the acceptability of canned meat, which, of course, was less popular than fresh, increased as the product resembled whole meat rather than stew or hash. Canned poultry, roast beef, corned beef, and pork luncheon meat, for instance, were much more popular than meat and vegetable stew, hash, or chili con carne. Spam achieved its unfortunate reputation merely because it was issued too often, he declared. When taken off the menu in the European theater for a year and then restored it was quite popular—ranking ahead of stews and hash. Canned foods were greatly preferred to dehydrated products. Problems of preparation of dehydrated fruits and vegetables handicapped their acceptability. Preparation of dehydrated eggs showed marked progress in the resulting dishes after three years. At the end of the war, they were at least a "qualified success."

An exception to the unpopularity of dehydrated products was dried whole milk powder, which was successfully used for half the milk requirement. Ice cream was a tremendously popular food, and by the end of the war an ice cream mix had been added to the ration.

Biological Value of Food Yeast Proteins and Their Role as Supplements to the Proteins of the Cereal Grains[1]

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FOR many years dried yeasts have been recognized as the most potent sources of the vitamin B complex. Although yeasts contain 45 to 50 per cent proteins, until recently they received relatively little attention from nutritionists as tissue builders. As a matter of fact, the scanty literature on the biological value of dried yeasts as the only sources of proteins in the diet is rather conflicting, a number of workers reporting them to be deficient in cystine or methionine (1).

The extreme shortage of protein foods in Europe precipitated by the war stimulated an investigation of the biological value of a brewers' yeast[2] and several strains of cultured yeasts for growth, reproduction, and lactation. The work was carried out with albino rats and standardized technique was used (2). A total of 300 animals was employed in this study. The brewers' yeast and Kitchen Food strain of cultured yeast were fed at 20, 30, and 40 per cent planes of intake, with and without cystine supplementation. The rest of the yeasts were fed at 30 and 40 per cent in the rations, with and without cystine additions.

The brewers' yeast, fed at 30 to 40 per cent planes of intake, furnishing 14 to 18 per cent proteins, permitted growth in the first, second, and third generations at a rate equal to that obtained by feeding 15 per cent purified casein for a period of 4 months. Reproduction and lactation were excellent in the first and second generations, the lactation efficiency being 85 to 95 per cent, which is comparable to results we obtained during the last 25 years on stock diets composed of natural foods. Third generation mothers are nursing their young successfully.

The animals on all the 5 strains of cultured yeast made excellent growth when the yeasts were fed at 12 to 14 per cent protein levels, without any amino acid additions. Second generation animals given strains of cultured yeasts during a 5-month period, showed growth which equalled or exceeded that obtained on 15 per cent purified casein. Third generation animals are growing satisfactorily on one strain of these yeasts furnishing 17 per cent proteins in the rations.

The yeasts in the rations supplied not only all the proteins but also the vitamin B complex, all the phosphorus, potassium, magnesium, and all the trace elements. In the third generation, however, it was found necessary to supply a complete salt mixture for optimum growth. The rations were fortified with an abundance of all the essential fat-soluble vitamins. Cerelose served as the source of carbohydrate. The above results, therefore, establish that a certain strain of brewers' yeast and certain strains of cultured yeasts, in addition to furnishing an abundance of the vitamin B complex, are also excellent tissue builders when used as the only sources of proteins for growth, reproduction, and lactation. With the great shortage of protein foods in Europe and with the existence of proteins of poor biological value in the Far East and in many parts of the Latin Americas, the introduction in the daily diet of highly nutritious yeasts in cooking and baking may prove of global significance in improving the nutritional status of large populations in various parts of the world.

Realizing that yeasts would never be used as meat

[1] Presented before the University of Chicago Institute of Nutrition, July 25, 1945, and in part in an address before the Pioneer Section of the American Society of Cereal Chemists, Wichita, Kans., September 8, 1945. This paper is a preliminary report on brewers' and cultured yeasts as sources of proteins for growth, reproduction, and lactation and as protein supplements to the cereal grains. Published with the approval of the Director of the Arkansas Experiment Station, Research paper No. 807, Journal Series, University of Arkansas. Received for publication September 17, 1945.

[2] One strain of brewers' yeast (K) and 5 strains of cultured yeasts were furnished by Anheuser-Busch, Inc., St. Louis, who aided in this study with a grant.

substitutes but rather as supplementary food products in our diets, I studied the influence of fortifying various cereal grains with small amounts of brewers' or cultured yeasts. A total of 240 animals was used to date in this investigation.

Enriched flour was blended with brewers' yeast, replacing 1, 3, and 5 per cent of the flour with equivalent amounts of yeast. All this was done, along with a high vitamin B complex mixture fed separately from the ration, in order to rule out the B vitamins as complicating factors. The control ration contained 84 per cent enriched flour as the only source of protein. The protein efficiency of the various combinations of flour and yeast was calculated as gain in weight per gram of protein intake. During a 10-week period, the results were as follows: Blending with 1 per cent yeast produced 71 per cent increase in body weight and an increase of 35 per cent in protein biological value; blending with 3 per cent yeast resulted in 131 per cent increased growth and an increase in 54 per cent in biological value; and blending with 5 per cent yeast produced 150 per cent increase in growth and 56 per cent increase in biological value.

The utilization of brewers' yeast in food products has been thoroughly studied by Durfee (3) of the School of Nutrition, Cornell University, who successfully introduced such yeast in cookies, cakes, doughnuts, meats, bread, and soup. It was found that yeast combined well with those foods and often added a spicy taste of its own. Yeast was found to make pleasant combinations with syrup and peanut butter. Heller, McCay and Lyon (4) incorporated significant amounts of yeast successfully in meat loaves, stews, cheese dishes, baked beans, and meat balls. These products were all accepted favorably in an industrial cafeteria serving 1500 people daily. Carr (5) has published recipes for use of dried yeasts in muffins, cookies, and cakes. Durfee (3) has calculated that 2 tablespoons dried brewers' yeast would provide 10 per cent of the daily adult needs of protein, 100 per cent of the thiamin, 25 per cent of the riboflavin, and 45 per cent of the niacin. She also maintains that two tablespoons of such yeast is the protein equivalent of one pork chop or one hamburger. Others (6–8) have been interested in the possibility of using dried yeast as an enriching ingredient in foods commonly consumed.

During World War II, the Nazis produced 100,000 tons or 200,000,000 lb. cultured yeasts annually as a dietary protein which, with the soybeans shipped from Manchuria by the Japanese, furnished the Germans the badly needed proteins to carry on their long aggressive war for world domination.

If yeasts are to be introduced in the daily preparation of foods, and they certainly should be, the breweries of this country could not begin to furnish enough. Of approximately 30,000,000 lb. surplus brewers' yeasts produced in this country, 3,000,000 to 4,000,000 is debittered and used in the pharmaceutical trade; 8,000,000 to 9,000,000 lb. is fed to livestock; and the remainder, which is more than 50 per cent of the total, is wasted in sewers (9). To meet future demands, there is a need for a great expansion of the primary cultured food yeast industry, now in its infancy. The nutritional requirements of cultured yeasts are relatively simple. For energy they require sugars, which are obtainable as molasses from the sugar cane industry in Louisiana. For nitrogen, the yeasts need only ammonia from which they build all the complex proteins. The molasses also furnishes a number of essential minerals derived from the sugar cane. Phosphates and lime are the only necessary mineral additions. These yeasts are aerobic and for rapid growth require the presence of an abundance of air, which is provided by vigorous stirring. From a pure cultured yeast isolated under the microscope, 25,000 lb. yeast is obtained in 72 hours. The significance of this is that more yeast proteins can be produced per acre of land, if the necessary sugars are available, than any other protein food which can be grown on the richest soil under ideal weather conditions and with the cheapest labor.

In this country, large-scale cookeries, like those in school lunchrooms, hospitals, and cafeterias, offer the best avenues for introducing highly nutritious dried yeasts in cooked and baked foods. With an intensive educational campaign, the adoption of yeasts by the housewife in the kitchen may be readily anticipated.

A blending of 88 per cent corn meal,[3] used as the only source of protein in the ration of albino rats, with 1 per cent cultured yeast (G strain) in a 10-week period resulted in a 57 per cent increase in body weight and about 28 per cent increase in biological value of the proteins; corn meal blended with 3 per cent of such yeast effected a 250 per cent increase in growth and a 117 per cent increase in biological value; and corn meal blended with 5 per cent of the cultured yeast produced a 300 per cent increase in weight and a 130 per cent increase in biological value. Such results should have wide application in the South where corn bread is used largely as the food staple instead of wheat bread.

A blending of 88 per cent polished (white) rice as the only source of proteins in the ration, with as little as 1 per cent cultured yeast (G strain), during a 10-week period produced a 41 per cent increase in body weight and blending such rice with 3 per cent of this yeast produced a 59 per cent increase in growth. The increase in biological value produced by the yeast additions, however, was only 15.7 per cent in both cases.

The blending of cereal grains with dried yeasts in everyday cooking and baking would be particularly

[3] The degerminated table meal obtained in groceries was used for these experiments.

beneficial to families of low-income levels whose diets are derived largely from vegetable proteins of low biological value. This is true in this country but much more so in the Latin Americas and in the Far East.

Perhaps we may expect the most far-reaching results of the use of cultured yeasts in improving the nutritional status of large populations in the Far East. While the United States has 3.3 acres per capita for raising crops, India and China have only 0.78 and 0.44 acres per capita, respectively, for crop production. Even if their farms were highly mechanized, India and China with a total population of about 900,000,000 simply do not have enough land to raise needed food (10).

The food yeast industry should be particularly important in the Far East where there are no dairy or meat industries and where the tillable land is not sufficient to grow the food necessary for the overpopulated countries of India and China. The situation in India is particularly favorable for the development of the food yeast industry, since in that country there are over 300,000,000 people who, for religious reasons, rule out meat from their diet; where there exists the largest sugar cane industry in Asia (Java being second) which operates only one third of the year; and where there are available large quantities of waste black-strap molasses (11) with which to make cultured yeasts. Such yeasts can be introduced in the native highly spiced foods and served from large-scale cookeries at industrial plants or large farms. The cost of the addition of yeasts to the old diets will be negligible. The tissue-building proteins, as well as the vitamin B complex, are so sadly deficient in the diets of Hindus that fortification of their diets with cultured yeasts, even to the extent of 3 per cent, will result in increase in weight and physical stamina. The improved physical conditions of the people should tend to increase productivity of the land. Improvement in the physiological status of the Hindus through newer and better nutrition promises increased output in production and added advantages for themselves as well as England. Not only India but also China, particularly South China, which lacks the advantages of the soybean crop, promises vast opportunities for improvement in nutritional well-being by the introduction of a cultured yeast industry. Japan, now reduced to live on its own islands about the size of Montana, and with a population of over 70,000,000, certainly could profit by supplementing its inadequate diet of rice and fish with small amounts of cultured yeasts, which would also provide ample additions of the vitamin B complex and thus eliminate beriberi from that country. The Latin-American countries could likewise be benefited by additions of cultured yeasts to their diets composed largely of beans and corn, which do not furnish proteins of good quality. Throughout the world the nutritional status of countless people could be improved in a short period of time by the development of cultured yeast industries.

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Effect of Light on Riboflavin in Milk

Riboflavin is known to be quite thermostable; but this important vitamin readily undergoes photolysis. For instance, milk boiled in a light room lost considerable amounts of riboflavin as compared to a very slight loss when boiled in the dark. Bottles of milk exposed to sunlight for one hour lost from 30 to 54 per cent riboflavin and the loss was greater upon longer light exposure. Since milk is probably the most regularly relied upon source of riboflavin for children as well as most adults, precautions should be taken to prevent photolysis of riboflavin before milk is consumed. Exposure to direct sunlight is very detrimental to the riboflavin content. Yet it is a common practice to deliver milk bottles on doorsteps where they stand fully exposed for long periods. A shady place or lightproof box or cabinet should be provided unless protective types of containers are adopted. As much as 40 per cent of the riboflavin in milk was destroyed after 2 hours' exposure to direct sunlight in clear quart bottles even though the milk was quite cool. After milk was exposed to sunlight and subsequently stored in the dark in a refrigerator, there was no further loss of riboflavin for the 20 hours investigated. Temperature is an important factor, and the photolysis of riboflavin at near freezing temperature was low as compared to near boiling temperature. The photolysis of riboflavin in raw milk was generally greater than in pasteurized milk and least in homogenized milk.—*Stamberg, O. E., and Theophilus, D. R.: J. Dairy Sc. 28:269, 1945.*

Effect of Large-Scale Methods of Preparation on Vitamin Content of Food: I. Potatoes[1]

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THE potato is one of the most important food items in the United States. In consumption figures it leads all other vegetables and makes a sizable contribution to the ascorbic acid, niacin, and thiamin contents of the American dietary. However, the data available on vitamin losses in preparation of this vegetable are, to some extent, conflicting. The present study was undertaken to obtain information as to the effect on the vitamin content of potatoes of large-scale methods of preparation such as those practiced in the Army consolidated mess and company mess. The methods investigated were those for steaming, steaming and mashing, boiling, and baking. Data were also obtained on the effect of peeling, of holding the peeled potatoes in water, of holding at steam table temperature of the steamed, mashed, and boiled products, and of holding baked potatoes in steam.

REVIEW OF THE LITERATURE

Ascorbic Acid. The ascorbic acid content of the raw potato varies greatly. Extreme values reported are 5.1 mg. per 100 gm. (1) and 56.1 mg. per 100 gm. (2). In a publication (3) prepared jointly by the Bureau of Human Nutrition and Home Economics and the National Research Council, a value of 12.6 mg. per 100 gm. is given as representative. The wide variation noted in ascorbic acid content of potatoes is associated with a number of factors—variety, cultural practice, location, maturity, and storage conditions (4). Lyons and Fellers (1) in their extensive study found that the Irish Cobbler grown in Kentucky had an ascorbic acid content 28 per cent of that of the same variety grown in Maine, an extreme case of variation due to locality. The vitamin C content of different varieties of potatoes grown in the same locality also varies over a wide range (1, 4). As the potato matures the ascorbic acid content decreases; there is also a gradual loss during storage (4). The standard deviation of values for the ascorbic acid content of individual potatoes has been studied in a number of varieties and found to run as high as 18 per cent (5). Apparently the vitamin concentration is slightly higher in the apex than in the stem end (4). These and other variations of vitamin C content of the potato complicate the problem of sampling and make a special sampling practice necessary.

A large amount of work has been done on the determination of losses of vitamin C during small-scale preparation of potatoes. While conditions are often similar to those of large-scale preparation, especially in the case of baked potatoes, the data are reviewed here separately.

Small-scale preparation: The boiling or steaming of potatoes in jackets resulted in no loss of ascorbic acid (2, 6, 7); when baked in jackets losses were variable, 2 to 66 per cent (2, 8, 9); also when pared and boiled, 4 to 58 per cent (1, 6–16). Steaming and pressure cooking gave moderate losses, 0 to 15 per cent (2, 6–8, 11, 15); mashing, more marked destruction, 9 to 69 per cent (2, 9, 11, 14); and French frying,

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23 and 33 per cent (2, 9). These data are summarized in Table 1.

Van Duyne *et al.* (8) found no significant change in vitamin C content of potatoes during soaking up to 3 hr. Presoaking of pared potatoes in water increased subsequent losses of ascorbic acid in boiling or pressure cooking by 4 per cent (7). Losses of vitamin C in water cookery are due to both thermal destruction and solution in cooking liquor. Holding cooked potatoes either hot or cold usually results in vitamin losses. Jenkins (17) found a 75 per cent destruction of ascorbic acid in mashed potatoes held warm 1 hr.; Van Duyne *et al.* (8), that boiled potatoes held in the refrigerator lost 45 per cent in 24 hr. and 79 per cent in 70 hr.; while Kahn and Halliday (2) found significant losses during holding on the steam table except for potatoes steamed in jackets.

The question of the effect of variety always arises in connection with the determination of losses of vitamin value in potatoes during cooking. Leverton and Werner (5) found that cooking losses for a number of varieties studied were quite uniform. Van Duyne *et al.* (8) and Esselen *et al.* (9), on the other hand, found that losses of ascorbic acid during baking of a number of different varieties varied significantly.

Large-scale preparation of potatoes: Much more variable data have been obtained in large-scale than in small-scale cooking. Holding peeled potatoes covered with water in a refrigerator overnight or in running water 4 hr. resulted in small losses in ascorbic acid (18–20); steaming, in losses up to 90 per cent (19–25); preparing mashed potatoes, 34 to 83 per cent (19, 20, 23, 24, 26); French frying, 16 per cent (20). There is ample evidence that cooked potatoes, retained on a steam table or in a heated cabinet, continue to lose ascorbic acid. Jenkins (17) found a 78 per cent loss in the vitamin C content of mashed potatoes held warm 1 hr.; Wertz and Weir (19), a 38 per cent loss in the same time under somewhat different conditions. These data are summarized in Table 2.

A special study by Eakin and Gerrard (27) of some unusual conditions in preparing and keeping food

TABLE 1

*Percentage loss of ascorbic acid in small-scale preparation of potatoes**

AUTHOR	METHOD OF PREPARATION					
	Boiled	Pressure Cooked	Steamed	Baked	Mashed	French-fried
Lyons and Fellers (1)	40					
Kahn and Halliday (2)			−2**	20**, 58	39	23
Oser, Melnick, and Oser (6)	12		2			
Richardson and Mayfield (7)	19, 0**	11				
Van Duyne, Chase, and Simpson (8)	13, −3**	15	14	12**, 12**, 13**, 22**		
Esselen, Lyons, and Fellers (9)	27–53			2**–66**	54–69	33
Halliday and Noble (10)	18–52					
Richardson, Davis, and Mayfield (11)	4	2–12	0–10		9–21	
Higgins (12)	58					
Olliver (13)	39					
Smith and Caldwell (14)	25				55	
McGregor (15)	10, 11, 16	0	8			
Ireson and Eheart (16)	11					

* Losses calculated from the peeled potato unless otherwise noted.

** In jackets.

TABLE 2

*Percentage loss of ascorbic acid in large-scale preparation of potatoes**

AUTHOR	METHOD OF PREPARATION					
	Soaked	Steamed**	Mashed	Baked	Boiled	French-fried
Marrack (18)	9					
Wertz and Weir (19)	3	55, 58	79			
Streightoff and Kornblum (20)	2	16	34, 63††	28†, 42††		16, 35††
Kardo-Sysoeva and and Ulanova (21)		40				
Nagel and Harris (22)		−68				
Dodds, McLeod, and Smith (23)		61, 40†	83	57†		
Peterson (24)		23	51	65†	53	
Heller, McCay, and Lyon (25)		51, 90				
Orent-Keiles, Hewston and Butler (26)			80	56, 72 50†	60	
	Oven browned	Lyonnaise	Escalloped	Hash browned	Buttered	Parsleyed
Peterson (24)	76	100	53	62	66	34

* Losses calculated from peeled potatoes unless otherwise noted.

** Includes values for potatoes steamed with and without pressure.

† In jackets.

†† After standing warm for 1 hr.

revealed that cooking potatoes in jackets and preparation of mashed potatoes destroyed 17 and 98 per cent vitamin C, respectively; after 8 hr. in the flight galley, total losses were 52 and 98 per cent.

Niacin. Values reported for the niacin content of raw potatoes vary from .32 mg. per 100 gm. (25) to 2.6 mg. per 100 gm. (26). The representative value for niacin in potatoes as purchased is given as 1.0 mg. per 100 gm. (3). Teply *et al.* (28) reported for boiled potatoes 1.18 mg. per 100 gm.; the raw peelings, 1.01 mg. per 100 gm.

Oser *et al.* (6) found that in potatoes cooked by their "new improved" method (using a small amount of water) there was no loss of niacin as compared with 26 per cent by the "old fashioned" method in which more water was used. Russell *et al.* (29) found losses of 7 to 23 per cent in boiling, the greater part of the vitamin being present in the cooking water; Cheldelin *et al.* (30), an average loss of 29 per cent in boiling, with less than 1 per cent of the vitamin in the cooking water.

Eakin and Gerrard (27) determined niacin losses in partially cooked potatoes as follows: boiled, 16 per cent; mashed, 22 per cent; cooked in jackets, 10 per cent; for potatoes held in the flight galley 8 hr., 22 per cent when boiled, 36 per cent when mashed, and 14 per cent when cooked in jackets. In their study of cooking practices in an Army mess, Orent-Keiles *et al.* (26) obtained data which indicated the following changes of niacin content in potatoes: baked 1½ hr., 28 per cent gain; peeled and baked 3 hr., 34 per cent gain; quartered, peeled, soaked, and baked 1¾ hr., 103 per cent gain; boiled, 17 per cent loss; and mashed, 30 per cent loss. Heller *et al.* (25) recorded losses of 2 and 10 per cent in steaming of potatoes.

Thiamin. The thiamin concentration of the raw potato was found to be (chemical test) .053 mg. per 100 gm. (25) to .17 mg. per 100 gm.(6) and (by rat growth method) .186 mg. per 100 gm. (31). The representative thiamin value given for potatoes as purchased is .09 mg. per 100 gm. (3). According to Leichsenring (4), the highest value obtained for 13 varieties grown near Halstad, Minnesota, was 135 per cent of that of the lowest. The thiamin content of these potatoes varied significantly according to locality, although this variation was not so marked as that of ascorbic acid. Storage had no appreciable effect.

Several studies have been made on the loss of thiamin in small-scale boiling of potatoes. Baker and Wright (32) observed a 25 per cent loss; Aughey and Daniel (33), 20 per cent; Oser *et al.* (6), 30 per cent. Aughey and Daniel (30) found a 16 per cent loss in baking; Oser *et al.* (6) 4 per cent in cooking in a small quantity of water in a covered container.

Thiamin losses in large-scale cooking of potatoes are less than those of ascorbic acid. Thiamin losses in such preparation are reported as follows: steamed, 5 to 14 per cent (22,25,34); mashed, 17 to 45 per cent (26, 34); baked in jackets, 11 per cent (26); boiled, 30 per cent (26); baked, 32 and 50 per cent (26). These results are itemized in Table 3. Holding cooked potatoes in a steam cabinet resulted in a further destruction of thiamin, 5 per cent in 1½ hr. (34).

Fenton *et al.* (35) investigated the effect of the amount of cooking water on the retention of thiamin in cooked dehydrated potatoes. When 50 gm. potatoes was cooked with 200 gm. water, the thiamin retention was 104 per cent; with 300 gm. water, 75 per cent; with 550 gm. water, 47 per cent. Most of the thiamin loss was due to solution in water. The effect of refreshing before cooking was negligible.

Eakin and Gerrard (27) in a study of flight rations found thiamin losses in partially cooked potatoes of 20 per cent for boiled, 29 per cent for mashed, and 23 per cent for those cooked in the jackets.

TABLE 3

*Percentage loss of thiamin in large-scale preparation of potatoes**

AUTHOR	METHOD OF PREPARATION				
	Soaked	Steamed	Mashed	Baked	Boiled
Nagel and Harris (22)..		5			
Wertz and Weir (34)...	5	14	17		
Heller, McCay, and Lyon (25).....		2, 7			
Orent-Keiles, Hewston, and Butler (26).....			45	32, 50 11**	30

* Losses calculated from the pared potato unless otherwise noted.

** In jackets.

Riboflavin. Riboflavin values reported for raw potatoes range from .025 mg. per 100 gm. (36) to .095 mg. per 100 gm. (30). The representative value for riboflavin in potatoes as purchased is given as .03 mg. per 100 gm. (3). Oser *et al.* (6) in a study of the effect of boiling with small and large quantities of water found, respectively, a 3 per cent gain and a 45 per cent loss of riboflavin. Cheldelin *et al.* (30) found losses of 9 and 43 per cent in the boiling of potatoes, none of the riboflavin being found in the cooking water. In a study of flight rations (27) riboflavin losses for partially cooked potatoes were: boiled, 9 per cent; mashed, 51 per cent; cooked in jackets, 9 per cent. Losses after storage for 8 hr in the flight galley were: boiled, 34 per cent; mashed, 64 per cent; cooked in jackets, 34 per cent. Data in another report (24) indicate no loss of riboflavin in baking but a 17 per cent loss in holding baked potatoes 1 hr. In a study of large-scale cooking at the Brooklyn Navy Yard (25), 2 and 10 per cent losses of riboflavin in the steaming of potatoes were reported.

EXPERIMENTAL PROCEDURE

Analytical Procedures:

Ascorbic acid was determined by the 2,4-dinitrophenylhydrazine method (37). Both total and dehydroascorbic acid were determined and reduced ascorbic acid was obtained by difference. The 2,4-dinitrophenylhydrazine method was used since Gould *et al.* (38) have shown the physiological activity of freshly prepared crystalline dehydroascorbic acid to be 80 per cent that of the reduced form, and it was felt that the use of a method of assay which measures only the reduced ascorbic acid would give rise to misleading conclusions on loss of antiscorbutic potency. The 2,4-dinitrophenylhydrazine method is in good agreement with the 2,6-dichlorobenzenoneindophenol method (39) as shown by the data in Table 4.

Niacin was determined according to the U. S. P. method (40–42) with the exception that 2 gm. d,l-tryptophane was substituted for 1 gm. l-tryptophane in the preparation of basal media (43). Acid production in 48 hr. (42) was determined by titration using brom thymol blue as indicator. It has been reported (44) that cereal products contain a water-soluble precursor of niacin which is made available to *Lactobacillus arabinosus* by autoclaving ½ hr. in the presence of 1 N H_2SO_4. Potatoes apparently contain this precursor also, for the niacin values obtained with samples autoclaved ½ hr. with 1 N H_2SO_4 were much higher than in corresponding samples when steamed.

TABLE 4

*Ascorbic acid in potatoes**

DESCRIPTION	2,4-DINITROPHENYLHYDRAZINE			2,6-DICHLOROBENZENONEINDOPHENOL	DIFFERENCE IN VALUES FOR REDUCED
	Total	Dehydro	Reduced (by diff.)	Reduced	
	mg./100 gm.				%
Raw, unpeeled	29.9	1.9	28.0	26.6	5.3
Raw, peeled	31.6	1.4	30.2	31.3	−3.6
Steamed	27.8	.8	27.0	27.3	−1.1
Mashed	21.1	4.3	16.8	16.2	3.7
Dehydrated	111.0	5.0	106.0	99.4	6.6

* Values for dehydrated potatoes are those reported by Roe and Oesterling (37). All other values were obtained in the course of present investigations.

Thiamin was determined essentially by the method of Hennessy and Cerecedo (45). A sample estimated to contain from 4 to 20 mcg. thiamin was weighed out to the nearest 1/10 gm., made up to approximately 80 ml. with 0.1 N H_2SO_4, and heated on a steam bath for 1 hr. After cooling to slightly below 50° C., 5 ml. 2.5 molar solution of sodium acetate containing 4 per cent takadiastase was added, and the mixture incubated at 50° C. in a constant temperature oven for 2½ hr. (46, 47). The thiamin was then concentrated by the base exchange procedure (45) with the exception that absorption and elution were carried out at room temperature with cold solutions. Concentration of thiamin was then determined by conversion to thiochrome.

Riboflavin was determined by the U. S. P. microbiological procedure with slight modifications (48, 49). Extraction of riboflavin was carried out as for thiamin by steaming with 0.1 N H_2SO_4 for 1 hr. As the concentration of riboflavin in potatoes is low, the final dilution of the extract was 1 gm. potato to 10 gm. acid. The acid production of *Lactobacillus casei* was determined by titration using brom thymol blue as indicator.

Solid matter was determined by drying slurries made with distilled water to constant weight (approximately 16 hr.) in a 70° C. vacuum oven with a pressure of 100 mm. or less (50). The problem of foaming of samples under vacuum was overcome by predrying.

Hydrogen ion concentration was determined with a *p*H electrometer on slurries of potatoes made with distilled water. Ordinarily the determination was made on a portion of the dry weight slurry, thinned to a convenient consistency.

Methods of Sampling:

The potatoes to be used in the cooking tests were obtained as needed from the general supply for the Pentagon Post Restaurant. Very few of the lots came from a single locality and consequently several varieties and commercial brands were represented in the course of the study.

The general plan for the experiment called for determinations on 8 to 12 replicate samples with each method of preparation. Preliminary work at this laboratory had shown that dry weight values were not always satisfactory for relating the weight of the sample to the weight of the original material. In the preparation of mashed potatoes the addition of milk, fat, and salt obviously introduced solid matter which would lead to an erroneous estimate of vitamin losses if the "dry weight" method of calculating were used. In other cases more subtle changes occurred; *i.e.*, the "batch weight" decreased slightly during boiling and a large percentage of solid matter was leached into the cooking water. To avoid the errors which might occur in "dry weight" calculations and to place the experiment on a sound theoretical basis, the "batch weight" was determined at different steps in the preparation of the food.

A platform scale with a capacity of 300 lb. and a sensitivity of ¼ oz., mounted on a movable platform, was used for weighing the entire batch of potatoes before and after each step in the preparation. The batch weight as recorded for the purposes of calculation included the weight of samples removed for analysis. In the case of the mashed potatoes held on the steam table, the determination

of batch weight was not possible because a part had been served. In this case an estimate was made on the basis of the average value for percentage solid content. Ingredients to be added to the mashed potatoes, such as salt, margarine, and milk, were used in weighed amounts.

The concentration of vitamins varies in different parts of a potato as well as in different potatoes. In order to ensure representative samples for the raw and whole cooked potatoes, a number of potatoes were selected at random from various parts of a batch. Five potatoes were used per sample in the study of mashed potatoes; 10 potatoes, in subsequent studies. A wedge was cut from each potato in such a way that epidermis, cortex, phloem, and pith were represented in normal proportions. In the case of mashed potatoes, several portions were taken from different parts of the batch. The sampling of holding water, cooking water, and steamed milk presented no difficulties.

All subsamples were prepared for analysis by slurrying with a stabilizing solution in a Waring Blendor. Subsamples to be stored were placed in brown glass bottles and kept in a refrigerator maintained at 40° F. Subsamples for the determination of total ascorbic acid were made by slurrying 30 gm. potato and 210 ml. 5 per cent metaphosphoric acid solution; for the milk, holding water, and cooking water, 75 ml. of these fluids and 25 ml. 20 per cent metaphosphoric acid were used. Subsamples for determination of dehydroascorbic acid were made up of 30 gm. potato and 210 ml. 5 per cent metaphosphoric acid solution containing 1 per cent thiourea. In general, the determinations of ascorbic acid (total and dehydro) were carried out immediately following preparation of the subsamples, and always within 24 hr.

Subsamples for the determination of niacin, riboflavin, and thiamin were made by slurrying 100 gm. potato or more and an amount of 0.1 N H_2SO_4 to give a satisfactory blend. The proportions varied depending upon the blending qualities of the potato. In the case of milk, cooking water, and holding water, a 90 ml. sample and 10 ml. 1 N H_2SO_4 were mixed. During slurrying a small quantity of chloroform was added. Preliminary tests showed that these subsamples could be stored in the refrigerator for several weeks without deterioration or measurable loss in vitamin value.

Subsamples for percentage dry solid determinations were made by slurrying at least 100 gm. potato with distilled water. During the first part of the project reproduceable data could not be obtained on blended subsamples of uncooked potatoes, and wedges of potatoes were used without blending. Later it was found that a mixture of 4 parts potato to 1 part distilled water, made by gradually adding the potato to the water during blending, gave reproduceable values which did not vary significantly from those obtained with wedges dried directly. Determination of hydrogen ion concentration was made on a mixture of 1 part potatoes and about 4 parts distilled water.

Methods of Preparation:

Methods of preparation were similar to those used in the Army mess or for large numbers of people. Mashing is the most common method; steaming is typical of the large-scale restaurant and consolidated mess procedure; boiling until done is the recommended procedure for the small Army mess; boiling for 2 hr. is a not uncommon method. Baked potatoes are cooked for varied lengths of time.

The procedure used for *mashed potatoes* was based on that used in the Pentagon Post Restaurant. A 100-lb. bag of potatoes was picked at random from the supply on hand for that morning's use in the kitchen. The potatoes were peeled in 50-lb. lots in a mechanical peeling machine, rinsed, hand-pared and eyed, cut in two when large, and amounts weighing 10 to 15 lb. were placed in 10-gal. tinned iron milk cans having a capacity of about 45 lb. The cans were then filled with cold tap water and held in the refrigerator overnight at about 40° F. The next morning (22 hr. later) the potatoes were drained, placed in 5-gal. zinc-galvanized steamer baskets, and steamed 45 min. in a free-venting steamer supplied with steam at 6 to 9 lb. pressure. After steaming, 50 lb. potatoes was poured into the 20-in. tin-coated iron bowl of a powered mixer and mixed at medium speed about ½ min. With the mixer at low speed, measured amounts of salt, margarine, and steamed milk were then added. After about 2 min. additional mixing at high speed, the mashed potatoes were placed in 2-gal. stainless steel pots arranged on the steam tables. Ice cream scoops were used in serving. Samples as follows were taken for analysis: raw, unpeeled; raw, peeled; steamed; mashed; and mashed, after holding on the steam table 45 min. Samples of the water in which potatoes were soaked and steamed milk were also taken.

Steamed potatoes were prepared as described above up to the point of mashing.

For *boiling*, about 30 lb. potatoes which had been held in water in the refrigerator overnight were drained, placed in a 20-gal. tinned iron pot, and covered with boiling water. Large areas of iron were exposed on the inner surface of the pots and no lids were used. The potatoes boiled "done" usually required about 30 min. actual boiling before they were tender according to the fork test. Others were boiled a full 2 hr. After cooking, the potatoes were placed in 2-gal. stainless steel containers and held on the steam table 1 hr. Samples as follows were taken for analysis: raw, unpeeled; raw, peeled; held in water 22 hr.; steamed; steamed and held 1 hr.; boiled done; boiled done and held 1 hr.; boiled 2 hr.; boiled 2 hr. and held 1 hr.; also water in which potatoes were boiled.

Baked potatoes were prepared for sampling immediately after baking, and after holding. Potatoes free from bruises were selected, scrubbed in water until clean, and coated with salad oil. Potatoes to be baked 1 hr. and 1½ hr. were placed in covered pans 4 x 18 x 24 in. For those to be sampled after holding, a larger quantity was baked until done (soft through but not crusted) in a covered pan 4 x 24 x 28 in. in an electric oven with the thermostat at 400° F. which maintained an oven temperature within ±25° except for the marked temperature drop when the pan was first set in the oven. The baked potatoes to be held were placed in the upper part of a covered, false-bottomed vessel on the gas range. Water boiling in the lower portion of the vessel furnished steam to keep the potatoes warm.

RESULTS

The data obtained for the potatoes processed in various ways—steamed and mashed, steamed, boiled, and baked—are presented in Table 5. A range as well as the average is included for the raw, unpeeled potatoes. Determinations of the *p*H were not made for the potatoes processed for mashing. For consideration of *p*H values attention is called to the fact that the tap water used had 12 grains hardness and a *p*H value of about 7.6. Riboflavin values were not obtained on the boiled potatoes or those baked and held. The average niacin content of the potatoes used, according to brand, is presented in Table 6.

Table 5 also presents the percentage vitamin retention in the potatoes at the different stages of all methods of preparation. These percentages were obtained by first calculating percentage retention of each individual batch[2] and then averaging retentions for the several batches. The total amount of each vitamin present in a sample was calculated on the basis of the batch weight. This value then served for the calculation of the percentage retention. For the mashed, steamed, and boiled potatoes the value taken as 100 per cent was that for the raw, peeled sample rather than the raw, unpeeled sample.

Differences in the percentage values (Table 7) were calculated to determine changes in vitamin value between different stages of preparation. The significance of each value was determined by comparison with the corresponding value calculated statistically for least significant difference (l.s.d.).[3]

[2] Calculations of the vitamin present at a given stage were made by the formula:

$$\%\ \text{vitamin}_1\ (\text{stage}_1) = \frac{100 \times \text{vitamin}_1(\text{stage}_1)/100\ \text{gm.} \times \text{batch weight}(\text{stage}_1)}{\text{vitamin}_1(\text{stage}_0)/100\ \text{gm.} \times \text{batch weight}(\text{stage}_0)}$$

In the studies on mashed, steamed, and boiled potatoes, the stage on which the calculations were based (stage_0) was the raw, peeled potato; in the studies on baked potatoes, the stage on which calculations were based was the raw, unpeeled potato.

DISCUSSION

Vitamin retention at the different stages of processing showed marked variation between different batches of food processed in a like manner.

The mechanical peeling of potatoes brought about significant decreases in content of all 4 vitamins studied. Average values from 23−8 replicates for unpeeled potatoes show total ascorbic acid as 104 per cent; niacin, 117 per cent; thiamin, 94 per cent; and riboflavin, 116 per cent of the concentration of vitamin present in peeled potatoes. Niacin and riboflavin are apparently concentrated in those portions of the potato removed by peeling.

In the preparation of mashed potatoes there were significant losses of ascorbic acid, although the results were variable (Table 5). Starting with raw, peeled potatoes as 100 per cent, the losses were as follows: mashed potatoes, total ascorbic acid, 24 per cent; reduced ascorbic acid, 42 per cent; for mashed, held on steam table 45 min., total ascorbic acid, 58 per cent; and reduced ascorbic acid, 68 per cent. Mashed potatoes had a higher average content of dehydroascorbic acid than did the steamed potatoes—4.2 mg. versus 1.5 mg. per 100 gm., this increase taking place when the destruction of reduced ascorbic acid was greatest. Losses of niacin, thiamin, and riboflavin were not significant.

Potatoes steamed, boiled done, and boiled 2 hr. showed statistically significant losses of ascorbic acid and thiamin (Table 5): total ascorbic acid, 11, 13, and 29 per cent respectively; reduced ascorbic acid,[4] 9, 10, and 26 per cent; niacin, 4,[2] 17, and 23 per cent; and for thiamin, 4,[2] 17, and 34 per cent. When these products were held on the steam table 1 hr. the losses were higher: total ascorbic acid, 19, 21, and 33 per cent; reduced ascorbic acid, 21, 20, and 33 per cent; niacin, 12, 20, and 27 per cent; and thiamin, 12, 21, and 36 per cent.

Significant losses from holding alone, calculated by difference, are: for the steamed potatoes, reduced

[3] When samples were paired, "least significant difference" was calculated by the following formulae:

$$\text{L.S.D.} = t_{(N-1)} \times s(\bar{x}_1 - \bar{x}_2)$$

$$s(\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{S(x_1 - x_2)^2 - (T_1 - T_2)^2/N}{N(N-1)}}$$

N = number pairs

In the few cases of unpaired samples the following formulae were used:

$$\text{L.S.D.} = t_{(n_1 + n_2 - 2)} \times s(\bar{x}_1 - \bar{x}_2)$$

$$s(\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{n_1 + n_2}{n_1 n_2} \times \frac{S(x_1 - \bar{x}_1)^2 + S(x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

n_1 = number samples group 1; n_2 = number samples group 2

[4] Not statistically significant.

TABLE 5

Effect of large-scale methods of preparation on vitamin content of potatoes

DESCRIPTION OF SAMPLES	BATCH WEIGHT	DRY SOLIDS	pH	VITAMIN CONTENT*					PERCENTAGE VITAMIN RETENTION**				
				Ascorbic acid		Niacin	Thiamin	Riboflavin	Ascorbic acid		Niacin	Thiamin	Riboflavin
				Total	Reduced				Total	Reduced			
	units	%		*mg./100 gm.*					%	%	%	%	%
Steamed and mashed													
Raw, unpeeled	100.0[b]	17.6[b]		27.1[b]	25.8[b]	3.32[b]	.129[b]	.032[b]	124	122	143	121	138
		16.0–19.8		18.0–31.1	16.6–30.9	1.60–4.50	.075–.152	.026–.050					
Raw, peeled	83.5[b]	16.7[b]		26.1[b]	25.3[b]	2.81[b]	.128[b]	.025[c]	100	100	100	100	100
Water from holding				0.1[b]			.001[b]	.001[d]					
Steamed	84.4[c]	16.2[c]		24.8[c]	24.3[c]	2.60[c]	.121[c]	.027[c]	94	95	98	97	97
Milk, steamed		12.5[b]		1.3[b]			.031[b]	.181[b]					
Mashed	98.9[b]	18.3[b]		17.1[b]	12.7[b]	2.27[b]	.112[b]	.046[b]	76†	58†	96	99†	96†
Mashed, held 45 min	97.2[b]	18.7[b]		9.9[c]	7.5[c]	2.40[b]	.113[b]	.044[b]	42†	32†	100	98†	87†
Steamed and boiled													
Raw, unpeeled	100.0	18.3	5.9	19.1	17.3	1.78	.104		135	133	154	118	
		14.8–22.0		14.8–25.6	13.9–23.5	1.22–2.80	.068–.150						
Raw, peeled	76.9	17.9	6.0	18.6	17.1	1.53	.115		100	100	100	100	
Raw, peeled, held in water 22 hr	80.0	17.4	5.9	17.7	16.5	1.48	.111		100	101	101	100	
Steamed	76.5	19.6	6.0[a]	16.2	15.3	1.46	.115		89	91	96	96	
Steamed, held 1 hr	73.4	19.8[a]	6.0[a]	15.2	13.6	1.41	.111		81	79	88	88	
Boiled done	81.2	17.2[a]	6.0[a]	16.6	15.9	1.26	.093		87	90	83	83	
Water from boiled done	77.2	0.9[c]	6.2[b]	2.7[b]		0.34[b]	.014[d]		13		22	14	
Boiled done, held 1 hr	78.3	18.4[a]	6.1[a]	15.7	14.5	1.27	.091		79	80	80	79	
Boiled 2 hr	80.5	15.7	6.0	11.8	11.3	1.03	.068		71	74	77	66	
Water from boiled 2 hr	68.2	1.7	6.0	3.7		0.58	.024[a]		17		35	20	
Boiled 2 hr., held 1 hr.	77.8	16.3	6.0	10.9	10.0[a]	1.02	.068		67	67	73	64	
Baked													
Raw, unpeeled	100.0	24.8	5.9	25.4	23.8	1.62	.083	.029	100	100	100	100	100
		22.8–25.9		23.2–27.6	21.9–25.8	1.30–1.78	.075–.090	.027–.031					
Baked 1 hr	93.0	27.9	6.1	24.0	21.9	1.73	.083	.032	88	86	101	93	102
Baked 1½ hr	85.3	30.2	6.0	21.5	18.4	1.94	.083	.034	72	66	104	86	98
Baked and held													
Raw, unpeeled	100.0	22.4	5.9	16.2	15.0	1.68	.103		100	100	100	100	
		19.5–24.2		10.0–18.4	9.0–17.3	1.41–1.90	.078–.137						
Baked	93.7	24.8	6.1	13.5	12.4	1.78	.101		79	79	100	93	
Baked, held 1 hr	94.2	24.7	6.1	10.8	10.0	1.82	.099		64	65	103	91	
Baked, held 2 hr	94.0	25.1	6.1	9.0	8.1	1.83	.097		53	52	103	89	
Baked, held 4 hr	93.3	25.2	6.0	6.7	6.0	1.83	.089		39	39	102	80	

* The values given are averages of assay results from a number of replicate batches—usually 10 to 15. The use of a smaller number of replicates is indicated as follows: a, 9 replicates; b, 8 replicates; c, 7 replicates; d, 6 replicates.

** The values for the raw peeled potato were used as the basis for calculation of vitamin retention of steamed, boiled, and mashed potatoes; the values for the raw unpeeled potato were used as the basis for calculation of vitamin retention of baked potatoes. These values are averages of the retentions calculated individually for each batch (*see* text).

† The vitamin value in the added milk was substracted before calculating these percentage values.

ascorbic acid, 12 per cent; niacin, 8 per cent; and thiamin, 8 per cent; for potatoes boiled done, total ascorbic acid, 8 per cent; reduced ascorbic acid, 10 per cent; niacin, 3 per cent; and thiamin, 4 per cent (Table 7).

Steamed potatoes and those boiled done retained

significantly larger amounts of all 3 vitamins than did the potatoes boiled 2 hr., and the steamed potatoes retained more than those boiled done, differences in the amounts of niacin and thiamin being significant. Thus cooking by steaming would seem to be the better of the 2 wet-cooking methods for the retention of the 3 vitamins studied.

In boiling, a large proportion of the reduction in vitamin content was due to solution in the cooking water. When the vitamins so "lost" were taken into account, significant thermal destruction was found to have taken place only in potatoes boiled 2 hr.: total ascorbic acid, 11 per cent, and thiamin, 14 per cent. However, niacin present in potatoes boiled 2 hr. and in their cooking water was significantly greater, 12 per cent, than that found in raw,

TABLE 6

Niacin content of potatoes according to brands

NO. OF BATCHES	BRAND NAME	LOCALITY	VARIETY	NIACIN
				mg./100 gm.
1	New Jersey	Hightstown, N. J.		4.2
4	Old Reliable	Cranbury, N. J.	Katahdin	3.7
1	Molly Pitcher	Englishtown, N. J.	Katahdin	3.0
1	Jersey	Indian Mills, N. J.	Katahdin	2.8
1	S	Wm. H. Sapell Co., Baltimore, Md.		2.8
1	Maine Potatoes, I.B.P.	Idaho Baking Potato Co., Maine		2.0
1	C	W. W. Capron & Sons, Wayland, N. Y.		2.0
3	Selected L.S.T.	Wellesville, N. Y.		1.9
5	Sterling	Maine		1.8
7	New Sweden	Idaho Falls, Idaho		1.8
10	4 Star	Lewisville, Idaho	Russet	1.7
3	Tater State	Presque Isle, Maine		1.7
4	Golden West	Twin Falls, Idaho		1.6
1		Maine		1.5
2	Big Chief	Bridgewater, Maine		1.2

peeled potatoes. The cause for this apparent increase in niacin is not known but might be due to actual synthesis of niacin or the splitting of "bound" niacin.

Baking caused significant losses in ascorbic acid and thiamin. In potatoes baked 60 min. the losses were: total ascorbic acid, 12 per cent; reduced ascorbic acid, 14 per cent; and thiamin, 7 per cent. In those baked 90 min.: total ascorbic acid, 28 per cent; reduced ascorbic acid, 34 per cent; and thiamin, 14 per cent. From the values given in Table 5 it is apparent that losses of ascorbic acid during the last half hour of baking were as great or greater than during the first hour. There was no appreciable change in the contents of niacin and riboflavin during baking.

Potatoes baked done, baked done and held 2 hr., and baked done and held 4 hr. showed significant losses respectively of 21, 47, and 61 per cent total ascorbic acid; 21, 48, and 61 per cent reduced ascorbic acid; and 7, 11, and 20 per cent thiamin. Changes in niacin content during baking and holding were not significant.

The niacin contents of 3 brands of Katahdin potatoes grown in New Jersey were found to be unexpectedly high, 2.8, 3.0, and 3.7 mg. per 100 gm., and 1 unidentified variety had a niacin content of 4.2 mg. per 100 gm. Other brands studied had a concentration of niacin which ranged from 2.8 to 1.2 mg. per 100 gm. The highest niacin value for potatoes encountered previously in the literature was 2.6 mg. per 100 gm.

SUMMARY

A study was carried out for the purpose of determining vitamin retention during large-scale preparation of mashed, steamed, boiled and baked potatoes. Determinations were also made on cooked potatoes after holding on the steam table or in an atmosphere of steam for various lengths of time.

A "batch weight" method was devised and used successfully as a basis for analysis of data to determine retention. A statistical interpretation of the significance of the results is presented.

Values obtained for the vitamin content of the several samples of raw potatoes showed considerable variation. The average value and the range in mg. per 100 gm. were respectively as follows: total ascorbic acid, 21.1 and 10.0 to 31.1; reduced ascorbic acid, 19.6 and 9 to 30.9; niacin, 1.99 and 1.30 to 4.50; thiamin, .104 and .068 to .152; and riboflavin, .030 and .026 to .050. For percentage dry solids the average was 23.1 and the range 14.8 to 25.9. Concentration of niacin and riboflavin was greater in the parts of the potato removed by peeling.

Destruction of ascorbic acid was marked in potatoes prepared by each of the 4 methods. Further destruction also occurred when the prepared potatoes were held warm either on the steam table or in steam. When steamed potatoes were mashed, there was a further destruction of ascorbic acid, and also extensive conversion of the reduced to the dehydro form. Ordinarily, in potatoes prepared by the other methods, less than 10 per cent of the total ascorbic acid was in the dehydro form, whereas in the mashed potatoes it was more than 20 per cent of the total. Potatoes cooked by boiling showed an appreciable loss of ascorbic acid in the water. Obviously this must be counted as lost, unless some plan is devised for using the water.

Thiamin retention was in direct relation to the heat lability of the vitamin and its solubility in water. Potatoes steamed or baked 1 hr. showed little loss of the vitamin, whereas in those baked 1½ hr. the decrease was appreciable. Boiled potatoes

TABLE 7

Differences in percentage vitamin retentions between various stages in the large-scale preparation of potatoes and a test of their significance*

SAMPLES COMPARED	BATCH WEIGHT	ASCORBIC ACID				NIACIN		THIAMIN		RIBOFLAVIN	
		Total		Reduced							
	diff.	*diff.***	*l.s.d.*†	*diff.***	*l.s.d.*†	*diff.***	*l.s.d.*†	*diff.***	*l.s.d.*†	*diff.***	*l.s.d.*†
Steamed and Mashed											
Raw, unpeeled—Raw, peeled	−19.7	*−24*	10	*−22*	10	*−43*	13	*−21*	6	*−38*	14
Raw, peeled—Steamed	1.0	−6	17	−5	18	−2	10	−3	5	−3	5
Raw, peeled—Mashed	18.4	*−24*	8	*−42*	8	−4	8	−1	9	−4	27
Raw, peeled—Mashed, held	16.4	*−58*	8	*−68*	10	0	9	−2	7	−13	17
Steamed—Mashed	17.4	*−18*	12	*−37*	12	−2		2		−1	
Mashed—Mashed, held	−2.0	*−34*	6	*−26*	4	4		−1		−9	
Steamed and Boiled											
Raw, unpeeled—Raw, peeled	−30.3	*−35*	8	*−33*	8	*−54*	10	*−18*	7		
Raw, peeled—Raw, peeled, held in water 22 hr.	4.0	0	5	1	5	1	4	0	6		
Raw, peeled—Steamed	1.3	*−11*	6	*−9*	8	−4	8	−4	6		
Raw, peeled—Steamed, held	−2.8	*−19*	9	*−21*	13	*−12*	7	*−12*	6		
Raw, peeled—Boiled done	3.8	*−13*	8	*−10*	8	*−17*	7	*−17*	9		
Raw, peeled—Boiled done, held	0.0	*−21*	7	*−20*	8	*−20*	6	*−21*	9		
Raw, peeled—Boiled 2 hr.	4.6	*−29*	6	*−26*	7	*−23*	8	*−34*	4		
Raw, peeled—Boiled 2 hr., held	1.0	*−33*	6	*−33*	6	*−27*	4	*−36*	3		
Raw, peeled—Boiled done and boiling water		0	9			5	10	−3	8		
Raw, peeled—Boiled 2 hr. and boiling water		*−12*	7			*12*	11	*−14*	4		
Steamed—Steamed, held		−8	10	*−12*	11	*−8*	5	*−8*	3		
Boiled done—Boiled done, held		*−8*	7	*−10*	8	*−8*	3	*−4*	4		
Boiled 2 hr.—Boiled 2 hr., held		−4	7	−7	9	−4	5	−2	4		
Steamed—Boiled done		−2	9	−1	11	*−13*	8	*−13*	10		
Steamed—Boiled 2 hr.		*−18*	8	*−17*	10	*−19*	11	*−30*	7		
Boiled done—Boiled 2 hr.		*−16*	9	*−16*	10	−6	10	*−17*	9		
Steamed, held—Boiled done, held		−2	11	1	14	−8	9	−9	10		
Steamed, held—Boiled 2 hr., held		−14	10	−12	14	*−15*	7	*−24*	6		
Boiled done, held—Boiled 2 hr., held		*−12*	9	*−13*	10	−7	7	*−15*	9		
Baked											
Raw, unpeeled—Baked 1 hr.	−7.0	*−12*	6	*−14*	6	1	8	−7	6	2	9
Raw, unpeeled—Baked 1½ hr.	−14.2	*−28*	7	*−34*	8	4	8	*−14*	7	−2	8
Baked 1 hr.—Baked 1½ hr.	−8.2	*−16*	5	*−20*	6	3	5	−7	4	−4	7
Baked and Held											
Raw, unpeeled—Baked	−6.3	*−21*	8	*−21*	10	0	5	−7	7		
Raw, unpeeled—Baked, held 1 hr.	−5.8	*−36*	7	*−35*	9	3	6	*−9*	5		
Raw, unpeeled—Baked, held 2 hr.	−6.0	*−47*	7	*−48*	8	3	6	*−11*	8		
Raw, unpeeled—Baked, held 4 hr.	−6.7	*−61*	9	*−61*	10	2	8	*−20*	7		
Baked—Baked, held 1 hr.		*−15*	10	*−14*	11	3		−2	4		
Baked, held 1 hr.—Baked, held 2 hr.		*−11*	6	*−13*	6	0		−2	4		
Baked, held 2 hr.—Baked, held 4 hr.		*−14*	6	*−13*	6	−1		*−9*	5		

* Differences were derived from percentage vitamin retention values given in Table 5. Calculations on the boiled, steamed, and mashed potatoes were made on the basis of vitamin values of the raw peeled potato; calculations on the baked potatoes were made on the basis of vitamin values of the raw unpeeled potato.

** Differences as great as or greater than the value calculated as the least significant difference are considered as significant. These appear in italics. A negative sign is used when the vitamin content of the first stage is greater than that of the second stage; no sign is used when the reverse is true.

† See text for method by which the least significant difference (l. s. d.) 95 per cent of the time is calculated.

showed a large loss of thiamin in direct proportion to the length of time of boiling. This loss was almost entirely accounted for by the vitamin found in the cooking water.

Actual destruction of niacin and riboflavin from any one of the methods of preparation was very small. Retention of niacin in the boiled potatoes closely paralleled that for thiamin, in accordance

with the similarity in their solubility in water. Potatoes mashed and held showed slightly lower retention of riboflavin than the freshly mashed.

Holding peeled raw potatoes in water in the refrigerator for approximately 22 hr. caused remarkably small loss of the vitamins studied.

From the standpoint of maximum retention of ascorbic acid, niacin, thiamin, and riboflavin in potatoes, steaming is recommended as the most satisfactory method of preparation. Baking in jackets a minimum length of time is the next best method; it has the further advantage of conserving those parts of the potato that are richer in niacin and riboflavin. Because of the significant loss of ascorbic acid during holding, it is also recommended that potatoes be consumed as soon as possible after preparation.

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The World War II Rationing Program

The meats, canned fish, fats and oils rationing program, which ended November 24, was the biggest rationing job in the history of any nation, Chester Bowles, administrator of the Office of Price Administration, stated in a release dated November 25, 1945. More than 600,000 retailers and wholesalers and about as many industrial and institutional users of meats and fats, as well as 5600 rationing boards participated. Virtually every bank in the country handled the ration bank accounts for this vast program.

Every three months OPA district officers were called upon to give allotments to 100,000 industrial users. Every two months, boards computed allotments for about 500,000 institutional users, such as restaurants, hospitals and so on.

Providing ration currency for more than 130,000,000 consumers in this country was a tremendous task, one of the largest printing jobs in history. More than 130 billion points changed hands monthly including those used by both consumers and institutional users.

The meats-fats rationing program became effective March 29, 1943, when the rapidly expanding needs of our armed forces and allies required that civilian consumption be controlled and that limited supplies available for civilians be fairly distributed. The point system was adopted to provide maximum consumer choice of cuts while limiting total consumption. This flexible system permitted rapid adjustments of point values and allowable inventories as supplies varied widely.

The flexibility of the program was shown repeatedly, according to Mr. Bowles. Record breaking supplies in the last quarter of 1943 and early in 1944 were utilized by drastically cutting point values on the kinds of meat that had to be moved rapidly. The needs of hospitals and other institutions were protected by a compulsory allocation system.

Some Factors Influencing the Food Intake of Preschool Children[1]

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RECOGNITION of the important part which food plays in the growth and development of the child has led to the investigation of factors influencing kinds and amounts consumed.

In reports of dietary studies on nursery school children, age, size and sex are the three factors commonly correlated with food intake. In general, older children eat more *in toto* but less per kilogram, and boys tend to eat slightly more than girls of the same age. However, Dunshee (1) found that while the older children ate more, sex made no difference in the total calories consumed.

Observations and investigations of other factors have been reported. White (2) noted that likes and dislikes greatly influence food intake; Wait and Roberts (3), that calorie intake increased on "spaghetti days" in a group of Italian children; Sweeney and Chatfield (4), that appetite, food habits, and mechanical problems influence the food intake of children; and Hahn and Stiebeling (5), that the chief causes of day-to-day variation in intake are the form in which the food is served and the amount of bodily activity. But Dunshee (1) failed to find a significant correlation between the quantity of food consumed and the amount of bodily activity. McKay and Patton (6) observed that onset of colds, excitement, and emotional strains tended to foster low food intake in nursery school children. They also noted a tendency for food intakes to be higher during the first part of the week than the last, which may suggest that fatigue plays a part.

The effect of particular foods on appetite has been observed. Cornell Nursery School children consumed more calories at lunch when they had one fourth cup fruit juice just before their meal and when they were allowed not more than 160 gm. milk unless they demanded it (7). Bartlett (8) found liver, broiled beefsteak and lamb kidneys valuable in the treatment of anorexia in children. McCarthy (9), in a study of 48 children, aged 2 to 7 years, noted that the 14 who demonstrated feeding problems had a higher carbohydrate intake and consumed fewer eggs and less fruit than the other children. McKay and Patton (6) observed higher caloric intakes on days when meat was served. They found that when milk intake was high the total food intake tended to be high.

Dunshee (1) and McKay and Patton (6) have investigated the influence of the season of the year on food intake. Dunshee found no correlation between the two. McKay and Patton found that the day-to-day variation in food intake was greater than the variation from season to season. However they found the summer food intake to be the lowest in 11 out of 17 cases, despite the fact that it should have been higher than that of the two preceding seasons, considering the age influence.

McCay and Bull (10) approached the problem chiefly from the standpoint of physical characteristics of "good" and "poor" eaters; Eliot (11), from the standpoint of personality traits of "finicky" eaters.

Eating habits in relation to the economic status and living conditions of the family have been studied by others (12–14), whose results have led to the conclusion that fewer eating problems are found in children in the lower economic levels and in rural families. Other family influences appear to play a part. McCarthy (9) found that the food dislikes of the family were associated with about 35 per cent of the child's food dislikes and Baldwin (15) noted a positive correlation between good table behavior and good appetite.

The effect of nursery school techniques upon food intake at lunch has been studied (16, 17). Of special interest in connection with this investigation is the study of Prevey (17), who provided 3 to 4-year-old children with a choice of foods, allowing them to serve

[1] Received for publication February 28, 1945. The authors wish to express their indebtedness to the nursery school staff whose cooperation made this study possible and to the senior nutrition students who assisted in the weighing of foods and recording of data.

[2] Dr. Mattson was killed in an automobile accident while this study was in progress.

themselves from a sideboard on which had been placed the regular nursery school menu plus an additional raw and cooked vegetable and a dessert. The sizes of the servings taken by the children were compared with so-called "normal" servings and it was found that the children took larger servings of all of the foods, except potatoes and milk, than would ordinarily be given them.

Prevey's results suggested that it would be of value to compare the nutritive intakes of nursery school children under conditions of self service and the usual or standard style of service, since we were not aware of any studies reporting data of this kind. Also, it was felt that there was a need for more information concerning influence of activity, age, rate of growth, size, sex, season, and type of diet on the nutritive intake of preschool children.

PROCEDURE

The study consisted of two parts: Part I, concerned with the influence of the style of food service used in the nursery school on total food intake and nutritive intake in terms of calories and grams of protein; and Part II, the relationship of nutritive intake to activity, age, rate of growth, size, sex, season, and type of menu.

Part I covered two periods: the late winter and spring, and the autumn of 1942.

The styles of service compared were designated as "standard" and "self" service. The former followed the regular routine except for the changes necessary in order to obtain the weights of the foods consumed. Glasses were marked with red lacquer at 60 and 120 gm. lines so that the nursery school teachers might easily keep a record of the milk as they helped the children pour it at the tables in the usual manner. The foods were weighed as they were served on the plate, and set at each child's place before he came in to lunch. Desserts were weighed and marked with the child's name. Second servings were weighed as requested by the children. Sandwiches were weighed and placed on a plate over a piece of paper giving the weight of the sandwich. The plate of weighed sandwiches was passed and the weight of the sandwich taken by a child immediately recorded by the person passing the plate. Foods left on the plate were weighed and the weights subtracted from the weights of the foods served.

Self service involved having the child, himself, put the foods, including milk and dessert, on a plate or other container balanced on a Hanson scale which had been placed on a table where two workers noted and recorded the weights. The foods were those on the regular nursery school menu and the children were instructed to take as much as they thought they could eat. They were also told that they might return for more. Plate wastes were handled as described for standard service.

During the first period of Part I, 14 Purdue Nursery School children, 8 boys and 6 girls, served as subjects. Comparisons were made of the number of grams consumed and the caloric and protein intake under the two styles of service for the same foods repeated a number of times, but not always in the same menus. A like number of children was studied in the second period, but the group consisted of 10 boys, two of whom were included in the first period, and 4 girls. Comparisons were made as before with the same menus repeated 4 to 6 times for each style of service. The plan was to serve four different menus during a period of a week and repeat these in subsequent weeks. A fifth menu on which no data were recorded was introduced each week for variety. Repetition of the same foods in the same menus made possible comparisons for the entire meal as well as for individual foods under the two styles of service. The menus used were as follows:

Menu I	Menu III
Liver Loaf	Creamed Salmon
Green Beans	Buttered Peas
Lettuce Sandwich	Baked Potato
Orange Milk	Bread and Butter Sandwich
Ice Cream	Orange Milk
Menu II	Peaches and Custard
Scrambled Eggs	Menu IV
Spinach	Meat Balls
Mashed Potatoes	Buttered Beets
Toast	Peanut Butter Sandwich
Apple Milk	Celery Milk
Chocolate Pudding	Fruit Jello

Part II of the study was begun in the fall of 1943 and carried through the winter and spring of the following year. In the evaluation of the data four different periods were considered: falls of 1942 and 1943 and winter and spring of 1944. Seven of the children, 4 boys and 3 girls, who had participated in the earlier study served as subjects. The age range of the boys in the fall of 1942 was 37 to 43 mo. (average 39½ mo.); that of the girls, 34 to 44 mo. (average 39 mo.). The standard type of service was used and food intake and the calories and protein consumed at the nursery school lunch were compared with similar data obtained on these subjects under standard service in the fall period of the first part of the study. Observations during two fall seasons a year apart made it possible to investigate the effect upon nutritive intake of increased age and size, with the exclusion of any existing seasonal influences. Also, since the study was carried through three different seasons, opportunity was afforded to study possible seasonal differences.

Activity ratings were made on the children by five members of the nursery school staff and an average of these ratings was used in investigating the relationship of nutritive intake to activity.

Possible differences in nutritive intake with varying types of menus were also considered in this part of the study.

Standard tables of food composition were used in calculating the calories and protein from the daily records of the weights of the different foods consumed by each child. The values per gram of the "made" dishes were obtained from calculations based upon the weights of the raw ingredients and the weight of the final product. The weighing in the kitchen was done by the nursery school dietitian or by others working under her supervision. In some instances senior nutrition students assisted both with the weighing in the kitchen and at the tables. The nursery school cook, who cooperated wholeheartedly in these experiments, also assisted with the weighing.

Preliminary work in the weighing of foods at the table was done at the beginning of each period of the two studies in order to train new workers and allow time for the children to become accustomed to it so that they might accept it as a matter of course.

TABLE 1

Influence of style of service on consumption of different types of foods, expressed as percentage of children whose consumption was increased with one type of service, as compared with consumption when the other type of service was used

TYPE OF FOOD	SELF SERVICE	STANDARD SERVICE
	%	%
Meats, fish, eggs, and cheese dishes	67.5	29.8
Cooked vegetables	54.8	41.8
Potatoes or rice	63.4	32.4
Raw fruits and vegetables	65.4	30.1
Sandwiches	46.9	45.5
Milk	30.4	62.4
Desserts	75.8	22.5

DISCUSSION OF RESULTS

The influence of style of service on the amount eaten at the nursery school lunch is summarized in Table 1. With regard to particular groups of foods, in general the children ate more protein-rich foods, raw foods, and potato and rice with self service, the ratio being about two to one in favor of these. As one might expect, self service most highly favored the consumption of desserts, approximately three fourths of the children consuming larger quantities of desserts when they were allowed to serve themselves. With regard to their consumption of sandwiches, there was practically no difference in their reaction to the two styles of service in this respect. Milk consumption was definitely lower under self service, standard service, on the average, effecting a higher milk consumption with 62.4 per cent of the children. It should be noted that under some food groups certain individual foods constituted exceptions with respect to the group as a whole, while in some instances intakes were equal. This explains why the percentage figures for self and standard service do not total one hundred.

Prevey (17) noted the tendency of the children to pour smaller amounts of milk for themselves than adults would have given them. Her subjects, like ours, took larger servings of desserts, cooked vegetables, raw foods and meat with self service. In contrast to results obtained in this study, she found that, on the average, the children took smaller servings of potatoes and larger servings of sandwiches with self service. There may be some question as to whether the results of the two studies are exactly comparable, since it is not clear as to whether Prevey's serving refers to a single helping or to the total amount of food consumed at a meal. In her investigation, too, the same children were not subjected to both types of service as in this study, but sizes of servings taken by the children under study were compared with an average serving or one "usually served to the children by teachers in the regular nursery school dining room."

Table 2 gives the differences in consumption in terms of calories and protein calculated for four different menus under self and standard service. The figures cover a total of 433 individual lunches served the 14 children participating in the study.

Of the four menus studied, both calorie and protein intakes were higher for most of the children with Menus I, II, and III under self service. With Menu IV, more children had a higher calorie intake under standard service and a higher protein intake under self service. However, the calorie and protein differences favoring one type of service or the other were sometimes very small. The largest caloric difference averaged by any one child on a given menu was 323 and the smallest 4 calories. The largest protein difference was 11.4 and the smallest 0.2 gm.

The nutritive intakes of the two subjects, J. R. and N. R., who participated in the earlier study, were higher with self service for all four menus, which might suggest that the novelty of the situation was not an important factor influencing food intake under self service.

The average calorie and protein intakes for each of the four periods of Part II of the study covering 377 individual luncheons are recorded in Tables 3 and 4. Since data were collected at the same season during 1942 and 1943, any possible effects of season can be ruled out in considering the influence of age on nutritive intake. In all but one case caloric intake was greater in October 1943 than in October 1942, the average for the group rising from 404 to 467 calories. Average protein intake rose in all but two cases, the group average increasing from 17.8 to 20.8 gm.

The boys averaged more calories in all four periods and more protein in all periods but the last, when intakes of boys and girls were about the same. Since the age ranges and average ages of the girls and the

boys were very close it was felt that age differences between the sexes exerted little if any influence. In age and size as factors, the boys averaged higher nutritive intakes than the girls.

TABLE 2

Differences in consumption in terms of increased calories and protein under 2 styles of service for 4 different menus

SUBJECTS	MENU I*				MENU II				MENU III				MENU IV			
	TYPE OF SERVICE				TYPE OF SERVICE				TYPE OF SERVICE				TYPE OF SERVICE			
	Standard		Self		Standard		Self		Standard		Self		Standard		Self	
	Cal.	Prot.	Cal.	Prot.	Cal.	Prot.	Cal.	Prot.	Cal.	Prot.	Cal.	Prot.	Cal.	Prot.	Cal.	Prot.
		gm.		*gm.*		*gm.*		*gm.*		*gm.*		*gm.*		*gm.*		*gm.*
J. B.		0.2	33				95	3.9	52	0.4			11			8.9
J. B.			144	5.2			162	5.9			128	3.3			2	4.1
K. C.	119	3.6					91	2.2	absent				12	5.4		
S. M.	19	1.1					116	2.6	129	3.9			33			3.6
C. R.			155	5.0	142	3.6					81	1.8	6			3.7
J. T.	31	0.2			174	3.8					323	8.7			83	3.8
A. B.	20			0.2			24	1.4	29			1.1	251	3.5		
D. H.			77	1.4			131	7.1			224	5.0	30			5.7
N. K.			100	11.4			171	7.2			216	3.9			180	6.6
B. K.			203	5.1			81	1.6	19	1.8				0.5	40	
J. R.			37	3.1		0.7	42				133	5.1			26	0.3
H. S.			95	7.7			94	4.4	40			3.8	4	9.0		
D. T.			128	5.2			145	3.9			180	4.2	78	3.5		
J. E.	31	2.8					108	5.0			75	2.4	50	5.0		
Averages	44	1.6	108	4.9	158	2.7	105	4.1	54	2.1	170	3.9	53	4.5	66	4.6
Number of children whose intakes were greater for each style of service—	5	5	9	9	2	3	12	11	5	3	8	10	9	6	5	8

* For menu items, *see* text.

TABLE 3

Individual and group average caloric and protein intakes at lunch during each of 4 periods

SUBJECTS	DAYS IN EACH PERIOD				CALORIC AND PROTEIN INTAKES DURING EACH PERIOD							
					Calories				Protein			
	I*	II*	III*	IV*	I*	II*	III*	IV*	I*	II*	III*	IV*
									gm.	*gm.*	*gm.*	*gm.*
C. R.	24	10	16	10	326	306	333	379	13.9	13.5	13.3	17.1
J. T.	21	14	18	10	475	529	508	497	20.4	24.9	21.5	18.1
J. B.	24	14	19	12	476	500	471	450	20.9	22.8	18.5	20.3
J. B.	24	10	17	10	329	440	342	367	14.4	19.5	14.1	15.6
S. M.	10	8	6	10	446	675	377	424	18.3	28.9	17.1	18.6
H. S.	4	10	10	10	402	442	417	372	19.8	18.7	15.8	15.0
B. K.	21	14	11	10	373	395	409	404	17.2	17.7	17.5	16.2
Averages for entire group					404	467	408	413	17.8	20.8	16.8	17.3
Average for 4 boys					421	475	435	422	18.9	21.5	17.5	17.2
Average for 3 girls					382	459	373	402	16.5	20.0	16.0	17.3

* Period I, October 1942; Period II, October 1943; Period III, January and February 1944; Period IV, April 1944.

calories and protein per kilogram the boys exceeded the girls except during the April 1944 period; in calories per inch the boys always exceeded the girls; while in grams protein per inch they exceeded the girls in all but the last period. Eliminating both

Increase in weight during the 1½-year period ranged from 2.6 to 3.4 kg. and in height from 3.8 to 4.7 in. Table 5 gives the rate of growth for each child and the average daily luncheon calorie and protein intakes during this time. It seems probable

TABLE 4

Individual and group average caloric and protein intakes at lunch per kilogram and per inch for each of 4 periods

SUBJECTS	AVERAGE CALORIC INTAKE BY PERIODS								AVERAGE PROTEIN INTAKE BY PERIODS							
	Per kilogram				Per inch				Per kilogram				Per inch			
	I*	II*	III*	IV*	I*	II*	III*	IV*	I*	II*	III*	IV*	I*	II*	III*	IV*
									gm.	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*	*gm.*
C. R.	22.4	18.4	19.3	21.3	8.8	7.7	8.2	9.1	0.96	0.82	0.77	0.96	0.38	0.34	0.33	0.41
J. T.	27.8	28.1	25.8	24.4	12.5	12.8	12.1	11.6	1.20	1.32	1.09	0.89	0.54	0.60	0.51	0.43
J. B.	28.8	27.0	23.9	22.6	12.1	11.8	10.8	10.3	1.27	1.23	0.94	1.02	0.53	0.54	0.44	0.46
J. M.	21.6	25.6	19.2	20.2	8.5	10.6	8.1	8.5	0.95	1.28	0.79	0.86	0.37	0.47	0.33	0.35
S. M.	25.2	31.5	17.5	20.1	10.9	15.4	8.4	9.3	1.04	1.35	0.80	0.88	0.45	0.66	0.38	0.41
H. S.	20.9	20.8	18.9	16.5	9.5	9.7	9.0	8.0	1.03	0.87	0.71	0.67	0.47	0.41	0.34	0.32
B. K.	25.2	24.1	24.2	23.2	9.5	9.4	9.8	9.4	1.16	1.08	1.04	0.93	0.44	0.42	0.41	0.37
Av. for group	24.6	25.1	21.3	21.2	11.7	11.1	9.5	9.5	1.09	1.14	0.88	0.89	0.45	0.50	0.39	0.40
4 boys	24.8	25.4	21.9	20.9	13.2	11.2	10.0	9.6	1.11	1.18	0.88	0.86	0.48	0.51	0.41	0.39
3 girls	24.3	24.7	20.3	21.5	9.7	10.8	8.8	9.1	1.05	1.08	0.87	0.92	0.42	0.49	0.37	0.40

* Period I, October 1942; Period II, October 1943; Period III, January and February 1944; Period IV, April 1944.

TABLE 5

Correlation of rate of growth with average caloric and protein intakes at lunch, over a period of 1½ years

SUBJECTS	RATE OF GROWTH IN 1½ YR.		AVERAGE CALORIC INTAKE			AVERAGE PROTEIN INTAKE		
	Total wt. increase	Total ht. increase	Total	Per kg.	Per inch	Total	Per kg.	Per inch
	kg.	*in.*				*gm.*	*gm.*	*gm.*
S. M.	3.4	4.7	481	23.6	11.0	20.8	1.02	0.475
J. B.	3.4	4.6	474	25.6	11.3	20.6	1.12	0.491
C. R.	3.3	4.7	338	27.1	8.5	14.5	0.88	0.364
J. T.	3.3	4.6	503	26.5	12.3	21.2	1.13	0.519
H. S.	3.3	4.0	408	19.3	9.1	17.3	0.82	0.385
J. B.	3.0	4.3	370	21.7	8.9	15.9	0.97	0.385
B. K.	2.6	3.8	395	24.2	9.5	17.2	1.05	0.411

TABLE 6

Comparative average caloric intakes of children consuming meat and meatless lunches

SUBJECTS	PERIODS						TIMES EACH TYPE OF MENU RESULTED IN LARGER INTAKES	
	October 1943		Jan.–Feb. 1944		April 1944			
	Meat	Meatless	Meat	Meatless	Meat	Meatless	Meat	Meatless
C.R.	357	276	302	343	380	355	2	1
J. T.	626	523	505	511	507	514	1	2
J. B.	521	503	450	500	509	448	2	1
J. B.	523	357	305	370	393	375	2	1
S. M.	785	821	414	353	504	409	2	1
H. S.	610	470	466	432	420	362	3	0
B. K.	368	368	383	446	439	405	1	1
Totals							13	7
Averages	541	474	404	422	450	410		

that the differences in the rate of growth for this group were too small to show any consistent relationship to nutritive intake. Also the lunch intake alone may not tell enough of the story for the entire day to justify any conclusions on this point.

Observations on seasonal variation in food intake (Table 3) showed that in 5 out of 7 cases caloric intakes were lower in January and February than in the preceding October and that they remained lower during the period falling in April. Protein intakes were lower in all 7 cases for January and February, but the differences were negligible in 2 cases. The group average fell from 467 calories in October to 408 in January and February with approximately the same figure (413) for April. The average protein intake fell from 20.8 gm. in October to 16.8 gm. in January and February and remained close to the latter figure in April (17.3).

McKay and Patton (6) found summer caloric intakes the lowest of the four seasons in 11 out of 17 cases. Their data reveal 9 cases in which observations were made on the same child in the fall and again in the following winter. Seven-day averages for each child during the 2 seasons show a caloric decrease from fall to winter for 6 out of 9 cases. The present study and McKay and Patton's data suggest that caloric intakes tend to be lower in the winter than in the fall.

No consistent relationship was observed between the activity ratings made during one period of the study and the average daily caloric intake for that period.

The statement (8) that meat stimulates the appetite suggested that it would be of interest to compare the effect on the caloric intake of the menus with and without meat. Beef loaf, liver loaf or braised liver were served on "meat" days; cottage

cheese, macaroni and cheese, Spanish rice, scrambled eggs or creamed eggs on meatless days. On "meat" days, care was taken to select menus in which ice cream, the most highly favored dessert, did not appear. On the basis of 20 comparisons, higher caloric intakes occurred 13 times with "meat" meals (Table 6). The findings here appear to give support to the above statement with regard to the appetite appeal of meat and are in agreement with the observations of others (6).

SUMMARY

A comparison was made of the food intake at lunch of a group of 26 nursery school children under two styles of service designated as "standard" and "self" service. The intakes of individual foods and groups of foods appearing in different menus and of foods always appearing in the same menus were determined. Calorie and protein values were calculated.

The percentages of children consuming more food under self service were higher for all food groups except milk.

For 3 out of 4 menus on which data were collected for 433 individual lunches, calorie and protein intakes averaged higher with self service.

The investigation included observations on the influence of activity, age, rate of growth, sex, season and type of diet on nutritive intakes. The observations were made on 7 children during 2 fall periods one year apart, and during the winter and spring following the second fall period.

Total calorie and protein intakes at lunch were found to increase with age when season was ruled out. However, when considered on the per kilogram and per inch basis, there was no consistent change during the period covered by this study.

The total and the per kilogram and per inch nutritive intakes of boys exceeded those of girls of about the same age range.

Winter and spring intakes averaged smaller than those of the preceding fall.

Calorie consumption with menus containing meat tended to be higher than with meatless menus.

Differences in growth rate among the children were small and the data do not lead to any definite conclusions in relation to nutritive intake. Results were likewise inconclusive with respect to activity. Further investigation of these factors should be made.

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New Curing Method for Cheddar Cheese

A new faster curing method for making American Cheddar cheese, which will produce an "aged cheese" of excellent quality and flavor in about 3 to 4 months—half the time formerly required—has been developed by research workers in the Bureau of Dairy Industry, USDA, and is said to be entirely feasible under commercial conditions, as well as simple and economical. It is believed that consumers will welcome an early return of well-aged cheese, which has a firm body and a clean and well-developed flavor, to replace the curdy or rubbery wartime product, according to a USDA release dated December 14, 1945.

Cheese held in the curing room at 60°F. was as fully ripened in from 3 to 4 months as that held at 50°F. or lower for 6 to 8 months, provided the cheese was made from pasteurized milk of good quality. The cheese held at the higher temperature also developed a better flavor than that held at the lower temperatures. The method is an outgrowth of earlier work which demonstrated that the use of pasteurized milk was an important step in producing cheese uniformly high in quality. The USDA has developed a reliable method for making cheese in which a controlled time schedule maintains the acidity within proper limits during the manufacturing process.

A Further Analysis of Food Selections of 80 Families in Lubbock, Texas[1]

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THE results of widespread and extensive research on the nutritional value of foods and the selection of these foods by various groups indicate that a large percentage of the American people are not eating sufficient food of the right kind for an optimum diet. In a dietary study of Lubbock families, Drake and Lamb (1) showed that 50 per cent of the dietaries were poor.

Much research has also been done regarding the quantity and type of food consumed; however, relatively little attention has been paid to the individual foods selected by the average family. For example: the Texas Food Standard (2) sets a goal of 1 pint to 1 quart of milk per person per day as a necessary part of a good diet. It would be worth-while knowing in what form this milk is commonly consumed. Is sweet whole milk, buttermilk, dry milk or canned milk most extensively used? What factors influence food selection? Irrespective of the quantity of a food consumed, or the number of times it appears in a weekly diet, what are the food selections of the average housewife? What effect does the quality of the diet, the income level, the occupation, or some other factor have on the food selection of families?

PLAN OF STUDY

In an attempt to solve the above questions a further analysis has been made of the Lubbock family dietaries studied by Drake and Lamb (1). Records of these weekly dietaries were collected mostly in the spring and summer of 1942 and the spring of 1943. The families were selected at random from among white American-born people. The data were collected by procedures described by Drake (3) and included a complete list of foods consumed in a week by each family. No records were kept of the frequency with which each food was consumed nor how it was served. In addition to the quantitative record of the foods consumed, each family indicated on a specially prepared list the methods of cooking and menu-making most commonly used and the types of foods preferred as well as the frequency with which certain foods were served. Since these were only check lists, they represented mostly the opinion of the person filling out the form and did not always accurately detail a family's actual food consumption and practices (1).

The present study is an analysis of the weekly market orders representing foods consumed by each family, for the purpose of determining food selections. Neither the quantity of food consumed nor the frequency with which a food was served within a week was considered in this analysis. No consideration was given the check lists included in the first study since the information contained therein failed to harmonize with quantitative records.

In addition to the 63 family dietaries covered in the previous study, 17 were collected which were not quantitatively complete and the dietary rating could not therefore be determined. However, the information was sufficient for a study of food selection, and they are included as the "unclassified" group. Thus 80 dietaries were included in the analysis of food selection, in which the 63 dietaries had been classified (1) as to nutritional quality as follows: 13 good, 15 fair, and 35 poor, and the remaining 17 unclassified. Food selections of each of the 80 dietaries were grouped and tabulated under the following headings: I. Dairy Products. II. Eggs. III. Meats, Meat Products and Fats. IV. Vegetables, Including Potatoes. V. Fruits and Tomatoes. VI. Cereals and Cereal Products. VII. Sugar and Sugar Products. VIII. Miscellaneous Products. The specific food items in these groups were further classified as fresh, canned, processed and dried foods.

From these tabulations was obtained the number of families in each dietary class selecting each food at least once a week. The 80 families were then regrouped according to the level of their income with their food selections tabulated as described pre-

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viously. A third classification of the families was made according to the occupation of the head of the family and the foods were again tabulated as to selection. Table 1 lists selections in detail of foods in the first five classifications, by all the group divisions. It was impossible to classify one of the families as to occupation since the father was deceased and the mother unemployed outside the home; the food selections of this family were therefore included only in the total percentages.

RESULTS

Table 1 shows that more families in the group with incomes under $1,000 selected canned milk than was true of any other group. Buttermilk and sweet skim milk were selected indiscriminately by the family groups. Margarine was selected more often than butter by the low income group, and less often than butter by the highest income group. In the diets of the "white collar" and professional groups, margarine was selected by almost as many families as was butter.

Only two families did not include eggs in their diets, and the dietaries of both were grouped in the poor class. One family was that of a laborer receiving less than $1,000 a year; the other, a skilled tradesman in the $1,000 to $2,000 bracket.

Table 1 also shows that all groups selected meat fairly uniformly. Beef and pork appeared about equally often in the food consumption records. A high percentage used bacon and ham but sausage was seldom selected. A smaller variety of meats was selected by both the lowest and the highest income groups.

Six families did not include fat as a shortening in their food selection. Of these, two were in the unclassified group, one in good, one in fair, and two in the poor dietary classification. They were all in the middle income classes and evenly distributed among the three top occupational groups. The selection of salad dressing increased as the buying power of the family increased. On the other hand, the lower the income the greater the number who used fats such as salt pork, bacon drippings and suet.

The dietaries were surveyed in the spring and early summer months at which season few West Texas gardens are in production. This fact probably helps to explain why such a small percentage of families selected a variety of vegetables including okra, as well as other vegetables. Whitacre (4) found okra very popular in other areas of Texas.

The selection of a variety of vegetables increased in families with better dietaries and with increase in income up through the $2,001 to $4,000 level. Above this, greater amounts of money did not seem to affect vegetable selection; in fact, all food selection was of poor quality. The trend toward increased variety of vegetables in the diet parallels higher levels of occupation; for instance, those in skilled trades used a greater variety than did laborers, and the professional group, the most of all. Potatoes were uniformly selected by all groups with sweet potatoes chosen approximately one fourth as often as white potatoes.

With regard to fruits and tomatoes, the outstanding feature of the results presented in Table 1 is the small variety of fruits used by both the lowest and the highest income groups and the correspondingly greater variety selected by the moderate income groups. Oranges and apples were the most commonly selected fruits. Stiebeling and Coons (5) report that apples, oranges and bananas are the most widely used fruits in this country. For all groups, the selection of citrus fruits exceeded that of tomatoes. For instance, 56 per cent more of the families in the low income group selected citrus fruit, even though an abundance of tomatoes can be easily produced and canned in this section, while all citrus fruit has to be shipped in. The selection of all fruits and tomatoes increased with other evidences of better dietary selection, and also with an increase in buying power up to the $4,000 income level. The selection of other fruits increased with rising levels in occupational skill of the head of the family.

Approximately one fifth as many families selected whole grain as compared with refined flours. None of the low income group used whole grain flours and only 4 per cent of the labor group. There were about one third as many families who selected whole wheat bread as compared with white bread; and about one half as many, whole grain cereals as compared with refined cereals.

White granulated sugar was used by 89 per cent of the 80 families while only 13 per cent used brown sugar and 5 per cent, powdered sugar. The greater the income the more brown and powdered sugar was used. No family in the lowest income, the labor, or the skilled trade groups selected brown or powdered sugar. The families' selection of syrups showed that 44 per cent selected corn syrup, 63 per cent, cane, and 14 per cent, maple. Honey was used by 29 per cent of the families.

Miscellaneous products included beverages, pickles and relishes, yeast and baby food. Some families did not report beverages other than milk and fruit juices. Only 34 per cent reported the use of coffee, 18 per cent tea, 19 per cent cocoa and chocolate, and 10 per cent, other beverages. Very few selections of pickles and relishes were recorded. A total of 35 per cent of the families included yeast in their selection which indicates that a large percentage of yeast bread was baked at home or that yeast was eaten as a supplement to the diet. Only one family listed baby food even though 6 families had children under two years of age.

TABLE 1

Selection of foods by 80 families in Lubbock

FOODS	PERCENTAOE OF TOTAL DIETARIES (80)	CLASSIFICATION											
		Dietaries of Different Quality				Income Level Groups				Occupation Groups			
		17 unclassified	13 good	15 fair	35 poor	7 under $1,000	34 $1,001–$2,000	34 $2,001–$4,000	5 over $4,000	21 labor	16 skilled trade	23 white collar	19 professional
	%	%	%	%	%	%	%	%	%	%	%	%	%
I. DAIRY PRODUCTS													
Whole sweet milk	93.8	94.1	100.0	100.0	88.6	42.8	97.1	100.0	100.0	85.2	93.8	95.7	100.0
Buttermilk	52.5	29.4	84.6	53.3	51.4	42.8	58.8	50.0	40.0	66.6	62.5	30.4	52.6
Canned milk	58.7	41.2	46.2	80.0	62.9	85.7	58.8	58.8	20.0	71.4	50.0	60.9	52.6
Dried milk	1.2	—	7.7	—	—	—	—	2.9	—	—	—	—	5.3
Cream	7.5	5.9	23.1	13.3	—	—	5.9	8.8	20.0	4.8	12.5	4.3	10.5
American cheese	75.7	70.6	92.3	73.3	68.6	14.3	73.5	85.3	80.0	57.1	87.5	87.0	63.2
Cottage and cream cheese	31.2	52.9	38.5	40.0	14.3	14.3	23.5	38.2	60.0	14.3	18.8	39.1	52.6
Ice cream	10.0	23.5	15.4	6.6	2.9	—	8.8	14.7	—	—	6.3	8.7	26.3
Butter	80.0	88.2	92.3	93.3	65.7	42.8	82.5	85.3	80.0	71.4	87.5	87.0	78.9
Margarine	50.0	29.4	61.5	40.0	60.0	57.1	47.1	55.9	20.0	42.9	37.5	56.5	63.2
II. EGGS	97.5	100.0	100.0	100.0	94.3	85.7	97.1	100.0	100.0	95.2	93.8	100.0	100.0
III. MEAT AND MEAT PRODUCTS, FATS													
Beef:													
Steak	20.0	23.5	30.8	20.0	14.3	28.6	14.7	23.5	20.0	14.3	18.8	21.3	26.3
Roast	18.7	23.5	15.4	26.7	14.3	14.3	11.8	26.5	20.0	19.0	18.8	17.4	21.1
Other beef	71.2	82.4	84.6	53.3	68.6	57.1	73.5	67.7	100.0	52.4	87.5	78.3	73.7
Pork:													
Chops and steaks	27.5	17.7	30.8	26.7	31.4	28.6	29.4	23.5	40.0	14.3	37.5	30.4	31.6
Ham	38.7	35.3	30.8	60.0	34.3	42.8	29.4	47.1	40.0	23.8	31.3	43.5	52.6
Sausage	6.2	5.9	—	6.6	8.6	—	5.9	5.9	20.0	4.8	12.5	13.0	—
Bacon	83.6	94.1	84.6	86.7	77.1	80.0	88.2	82.5	71.4	61.9	93.8	87.0	94.7
Other pork	3.7	11.8	—	—	2.9	28.6	2.9	—	—	9.5	—	4.3	—
Lamb	15.0	5.9	30.8	26.7	8.6	—	11.8	23.5	—	4.8	6.3	13.0	36.8
Poultry:													
Fryers	15.0	11.8	23.1	13.3	14.3	—	14.7	17.7	20.0	14.3	6.3	30.4	5.3
Hens	20.0	23.5	30.8	13.3	17.1	—	26.5	20.7	—	14.3	25.0	26.1	15.8
Fish:													
Fresh	18.7	23.5	30.8	20.0	11.4	—	17.7	26.5	—	4.8	31.3	17.4	26.3
Canned	25.0	23.5	46.2	26.7	17.1	—	17.7	35.6	40.0	9.5	18.8	43.5	26.3
Miscellaneous Meats:													
Liver	23.7	41.2	23.1	26.7	14.3	—	20.7	32.3	20.0	14.3	18.8	26.1	36.8
Tongue	3.7	5.9	—	6.6	2.9	—	2.9	5.9	—	4.8	—	—	10.5
"Wieners," etc.	5.0	—	7.7	6.6	5.7	—	2.9	8.8	—	4.8	—	8.7	5.3
Chili and tamales	6.2	5.9	7.7	6.6	4.7	14.3	2.9	8.8	—	4.8	6.3	8.7	5.3
"Luncheon meats"	8.7	17.7	—	6.6	8.6	—	2.9	17.7	—	9.5	—	17.4	5.3
Gelatin	17.5	29.4	15.4	13.3	14.3	—	23.5	17.7	—	9.5	6.3	26.1	26.3
Fats:													
Shortening	92.5	88.2	92.3	93.3	94.3	100.0	94.1	88.2	100.0	100.0	87.5	91.3	89.5
Salad oil and dressing	36.2	58.8	30.8	40.0	25.7	14.3	17.7	55.9	60.0	23.8	18.8	47.8	52.6
Miscellaneous	13.7	23.5	—	20.0	11.4	42.8	2.9	17.7	20.0	14.3	—	17.4	21.1
IV. VEGETABLES													
Fresh:													
Potatoes, white	96.2	100.0	100.0	93.3	94.3	100.0	94.1	97.1	100.0	100.0	87.5	100.0	94.7
Potatoes, sweet	35.0	29.4	38.5	33.3	37.1	28.6	29.4	41.2	40.0	28.6	50.0	39.1	26.3
Cabbage	35.0	41.2	53.8	20.0	31.4	42.8	26.5	41.2	40.0	23.8	31.3	30.4	57.9
Carrots	68.7	88.2	76.9	93.3	45.7	57.1	52.6	85.3	80.0	57.1	62.5	73.9	84.2
Onions	21.2	29.4	38.5	26.7	8.6	28.6	11.8	32.3	—	9.5	18.8	21.3	36.8
Other root vegetables	17.5	17.7	23.1	33.3	8.6	—	5.9	35.6	—	4.8	12.5	21.3	31.6
Peas	12.5	11.8	30.8	20.0	2.9	14.3	2.9	20.7	20.0	—	18.8	13.0	21.1
Squash	18.7	29.4	30.8	33.3	2.9	14.3	5.9	32.3	20.0	4.8	18.8	17.4	36.8
Greens	56.2	94.1	53.8	46.7	42.9	42.8	44.1	67.7	80.0	42.9	68.8	52.2	68.4

TABLE 1—*Continued*

FOODS	TOTAL DIETARIES (80)	CLASSIFICATION											
		Dietaries of Different Quality				Income Level Groups				Occupation Groups			
		17 unclassified	13 good	15 fair	35 poor	7 under $1,000	34 $1,001–$2,000	34 $2,001–$4,000	5 over $4,000	21 labor	16 skilled trade	23 white collar	19 professional
	%	%	%	%	%	%	%	%	%	%	%	%	%
IV. VEGETABLES—*Continued*													
Fresh—Continued													
String beans	25.0	11.8	30.8	40.0	22.9	—	20.7	35.6	20.0	9.5	31.3	26.1	36.8
Okra	2.5	—	—	6.6	2.9	—	2.9	2.9	—	4.8	6.3	—	—
Broccoli	2.5	5.9	—	6.6	—	—	—	2.9	20.0	—	—	4.3	5.3
Asparagus	2.5	—	7.7	6.6	—	—	—	5.9	—	—	—	4.3	5.3
Green peppers	5.0	5.9	15.4	—	2.9	—	8.8	2.9	—	—	25.0	—	—
Celery	15.0	29.4	7.7	20.0	8.6	—	8.8	17.7	60.0	4.8	25.0	21.3	10.5
Lettuce, head	52.5	58.8	61.5	66.6	40.0	28.6	44.1	64.7	60.0	42.9	43.7	60.9	63.2
Cucumbers	7.5	11.8	—	20.0	2.9	—	5.9	11.8	—	—	6.3	8.7	15.8
Corn	1.2	—	—	6.6	—	—	—	2.9	—	4.8	—	—	—
Canned:													
Peas	27.5	23.5	53.8	40.0	14.3	42.8	26.5	26.5	20.0	23.8	25.0	21.3	42.1
Beans, all	28.7	35.3	38.5	40.0	17.1	14.3	20.7	41.2	20.0	23.8	31.3	26.1	36.8
Greens	20.0	17.7	53.8	13.3	11.4	—	20.7	26.5	—	19.0	12.5	26.1	21.1
Asparagus	5.0	11.8	7.7	6.6	—	—	2.9	5.9	20.0	4.8	—	4.3	10.5
Okra	2.5	—	7.7	—	2.9	—	2.9	2.9	—	4.8	—	4.3	—
Corn	27.5	17.7	53.8	20.0	25.7	28.6	32.3	23.5	20.0	28.6	31.3	26.1	21.1
Squash	3.7	—	7.7	—	5.7	—	—	8.8	—	9.5	—	4.3	—
Other	15.0	5.9	—	13.3	25.7	—	14.7	17.7	20.0	9.5	12.5	17.4	21.1
Soups	6.2	5.9	7.7	6.6	5.7	—	5.9	8.8	—	—	6.3	13.0	5.3
Kraut	5.0	5.9	7.7	6.6	2.9	—	8.8	—	20.0	—	6.3	13.0	—
Dried:													
Peas	13.7	—	38.5	6.6	14.3	57.1	14.7	5.9	—	23.8	6.3	8.7	10.5
Beans	65.0	52.9	84.6	66.6	62.9	57.1	73.5	58.8	60.0	76.2	75.0	47.8	63.2
Nuts	30.0	41.2	61.5	33.3	11.4	—	32.3	35.6	20.0	4.8	18.8	56.5	36.8
Peanut butter	56.2	52.9	61.5	53.3	57.1	28.6	50.0	67.7	60.0	42.9	56.3	69.6	57.9
V. FRUITS AND TOMATOES													
Citrus Fruits:													
Grapefruit	58.7	41.2	61.5	46.7	25.7	42.8	20.7	50.0	80.0	33.3	37.5	39.1	47.4
Oranges	77.5	94.1	100.0	80.0	60.0	57.1	73.5	85.3	80.0	47.6	87.5	87.0	94.7
Lemons	37.5	41.2	46.2	60.0	22.9	14.3	32.3	50.0	20.0	9.5	37.5	60.9	42.1
Juices	20.0	23.5	23.1	20.0	17.1	14.3	20.7	20.7	20.0	19.0	25.0	17.4	21.1
Tomatoes:													
Canned	47.5	58.8	46.2	53.3	40.0	71.5	47.1	44.1	40.0	52.4	50.0	39.1	47.4
Fresh	53.7	47.1	76.9	46.7	51.4	14.3	64.7	55.9	20.0	38.1	56.3	52.2	73.7
Juice	11.2	—	25.1	20.0	8.6	—	8.8	17.7	—	9.5	6.3	8.7	21.1
Other Fruits, Fresh:													
Apples	60.0	70.6	69.2	46.7	57.1	42.8	55.9	67.7	60.0	57.1	62.5	60.9	63.2
Bananas	31.2	41.2	38.5	33.3	22.9	28.6	23.5	38.2	40.0	14.3	37.5	26.1	52.6
Grapes	7.5	—	7.7	26.7	2.9	—	—	17.7	—	—	—	13.0	10.5
Peaches	5.0	—	—	6.6	8.6	—	—	11.8	—	4.8	—	8.7	5.3
Berries	16.2	29.4	15.4	26.7	5.7	—	5.9	29.4	20.0	4.8	6.3	21.3	31.6
Other	16.2	17.7	30.8	20.0	8.6	—	11.8	23.5	20.0	4.8	18.8	13.0	36.8
Other Fruits, Canned:													
Cherries	8.7	—	30.8	6.6	5.7	—	14.7	5.9	—	—	18.8	4.3	15.8
Pears	13.7	17.7	30.8	6.6	8.6	—	8.8	20.7	20.0	9.5	18.8	4.3	26.3
Peaches	28.7	29.4	46.2	33.3	20.0	14.3	26.5	38.2	—	19.0	37.5	26.1	36.8
Pineapple	18.7	17.7	25.1	46.7	5.7	—	2.9	41.2	—	4.8	18.8	21.3	31.6
Other	27.5	35.3	38.5	33.3	17.1	28.6	23.5	29.4	40.0	23.8	12.5	39.1	31.6
Juices	10.0	—	46.2	13.3	—	—	—	23.5	—	—	6.3	17.4	15.8
Other Fruits, Dried:													
Prunes	30.0	35.3	46.2	20.0	25.7	28.6	23.5	35.6	40.0	23.8	25.0	26.1	42.1
Apricots	8.7	—	30.8	13.3	2.9	—	8.8	11.8	—	4.8	12.5	8.7	10.5
Raisins	20.0	29.4	38.5	20.0	8.6	14.3	14.7	23.5	40.0	9.5	31.3	21.3	21.1
Apples	2.5	—	7.7	—	2.9	14.3	—	2.9	—	4.8	—	4.3	—
Other	6.2	11.8	7.7	—	5.7	—	8.8	5.9	—	—	6.3	13.0	5.3

SUMMARY AND CONCLUSION

The accustomed dietary quality, income level, and occupation influence the food selection of the average family in Lubbock, Texas. Naturally, families with better dietaries select a wider variety of food than do those with dietaries of poor quality. The food selection of families eating a diet of fair quality was, as a rule, intermediate between that of the good and the poor groups. People with a poor dietary live on a limited selection of food which does not represent the best food for adequate nutrition. Their problem is both one of selection and of quantity.

Food selection improved with an increase in family income up to a certain limit, apparently $4,000 or more. The families with income of $1,000 or less had a very limited selection of food and frequently not of the proper kinds for health. Foods may be chosen so that health and efficiency can be maintained on a comparatively low income; however, there is a limit below which an adequate diet can not be maintained. Naturally, the selection is more difficult when the income is limited than when it is adequate to meet the cardinal needs of a family. The purchaser's knowledge of food values and her appreciation of the importance of good nutrition are necessary to accomplish an adequate diet on a low income. Unfortunately, low incomes are usually associated with low levels of education—thus establishing a vicious cycle. Foods are not selected in keeping with the purchasing power of the family; for instance, the low income families in this study did not select more potatoes or cereals, especially whole grain cereals, than did the higher income groups. They did, however, select more canned milk and low-cost fats such as salt pork and suet, as well as more dried beans and peas.

The professional group made the best food selections both in type and variety. Both the education and buying power of such families appeared to influence their food selections significantly.

Such foods as eggs, granulated sugar, shortening, potatoes, meats (particularly beef and pork), and refined cereals were selected by all the groups uniformly. The greatest variations came in the selection of such protective foods as fruits, fresh and canned vegetables other than potatoes, whole grain cereals, butter, margarine and milk. These are the foods that are among our best sources of minerals, vitamins and amino acids. An adequate supply of these protective foods is necessary for optimum nutrition and health.

This study includes an analysis of the influence of but a few factors affecting food selection of families. However, there can be other contributing factors such as: the problem of the availability of food; the effect of seasons of the year; family food choices as influenced by cultural development, religious beliefs, racial traits, food customs, etc.; and the extent to which the person is trained in the wise use of food. All these influence food selection, and instances of each were noted among the 80 family dietaries surveyed.

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Amalia Lautz Author of Review Article

An article entitled "Signposts in Human Nutrition," by Amalia Lautz, University of Tampa, appeared in the *Quarterly Journal* of the Florida Academy of Science in 1945. Some of the indications of the trends that research and application relative to the diet of normal people would follow after the war are listed by Miss Lautz as follows: (1) the growing significance attached to nutrition as a public health factor; (2) the emphasis on differentiating research in human nutrition from research based on laboratory animals; (3) the increasing amount of study being given to normal human physiological utilization of food nutrients; (4) the expressed need for an intensified research on better tests for diagnosing subclinical states of undernutrition; (5) greater emphasis on the analysis of foods and fluids as actually consumed in everyday life; and (6) recognition of the fact that so-called laboratory standards of accuracy, as applied to human nutrition, are in reality false and misleading. Miss Lautz' estimate of these trends was based on examination of 267 articles and abstracts which appeared during 1943 and the first 10 months of 1944.

Editorial

PROTEIN—PAST, PRESENT AND FUTURE

Within recent years interest in the subject of the proteins has tended to overshadow, at least temporarily, the previous intense concern over the vitamins. The amino acid moieties of the protein molecule, too, despite the fact that the existence of these was discovered 135 years ago,[1] have taken on decidedly fresh interest, heightened perhaps by the fact that foods known to be good sources of the essential amino acids have tended to be in short supply.

Aside from this, it is of interest to recall that during a period of more than a century between the discovery of the first amino acid and Rose's discovery of the twenty-second of these protein "building stones," the total protein intake, rather than the quality in respect to biological adequacy, was the primary consideration.

While evidences of protein deficiency may not be so dramatic as is true of certain of the other nutrients, yet, as Mitchell (this JOURNAL, March 1942) said, "the protein deficient animal will ultimately, after a prolonged and miserable existence, succumb like the 'one hoss shay' through a simultaneous failure of all its parts." He further explains that this general collapse of tissue functioning is sufficient testimony that the proper nutrition of the whole body structure is dependent upon an adequate supply of amino acids.

Concurrently in the same issue of this JOURNAL, Elman stressed the hazards of protein deficiency in the surgical patient, largely because this affects the integrity of the blood plasma. In line with Mitchell's comment, he included the statement: "If there were any one 'secret of life,' protein might well be considered to be at the heart of it, since protein is the essential stuff of which all living tissue is made." Incidentally, it will be recalled that Elman was one of the first proponents of the use of protein digests intravenously.

Again, in 1943, other papers concerned with the problem of protein appeared in this JOURNAL, in which animal proteins were evaluated for their amino acid contents by Macy and her co-workers (August 1943), followed by a discussion by Melnick of the essential amino acids in nutrition and an evaluation of protein hydrolysates as dietary supplements (October and November 1943). It was at this time, too, that the parenteral use of amino acids in the treatment of burns, poorly healing wounds, and ulcers (*J. A. M. A.* 121: 163, 1943) was introduced.

The possibility of the use of vegetable sources of protein, especially soybean products, to supplement a diminishing supply of meat was subsequently discussed by Leaming (this JOURNAL, December 1943) and was further amplified by Block and Bolling (this JOURNAL, February 1944) who evaluated a wide variety of plant proteins as possible sources of the essential proteins; while Everson and Heckert, in the same issue, discussed specifically the leguminous sources of biologically valuable protein.

In this issue also, Cannon expanded on the relatively new concept of an adequate food intake, particularly of protein, in the acquisition of a high level of immunity, pointing out that the antibody mechanism is dependent upon proteins of good biological quality with which to supply the building stones for globulin synthesis.

This chronological record of the developments in our knowledge of protein, as they have been discussed in this JOURNAL in recent years, would not be complete without mention of the profound and perhaps farseeing views of Mitchell as expressed in an article entitled "Adaptation to Undernutrition" (December 1944), to which Luck later referred in a review of the progress of nutrition in 1944 (*Nutrition Reviews*, March 1945). The theme of Mitchell's discussion is based on a rewording of LeChatelier's theorem to this effect: If an animal in equilibrium with its food supply is subjected to nutritional stress (inadequate or excessive supply of one or more nutrients) he will react to minimize or to undo entirely the effects of such nutritional stress. The weight of evidence of man's ability to adapt to protein undernutrition, as presented by Mitchell and later analyzed by Luck, seems hardly so conclusive or clearcut as that supporting man's ability to adapt to other deficiencies.

In any event, interest in the therapeutic value of

[1] Perspectives in Biochemistry, p. 23. Cambridge University Press, 1938.

high protein diets (Johnson, this JOURNAL, December 1944), protein hydrolysates (Gaunt, *Nutrition Abstracts and Reviews* 13: 501, 1944), and in the significance of protein to the healthy maintenance of the body and the effects of insufficient protein intake (Anderson, this JOURNAL, July–August 1945) continues. This interest has also been intensified by the publication of an excellent series of articles on protein nutrition in health and disease which appeared in the *Journal* of the American Medical Association during 1945, and which are now available in monograph form as noted under the book review section of this JOURNAL. Elsewhere in this issue will be found an excellent report of the recent and distinguished work of Co Tui which serves to bring the clinical aspects of protein nutrition up to date; while an equally important subject, methods of filling the high protein diet prescription, has been ably handled by Perry. A relatively new and as yet not fully developed means of supplementing the protein supply by the use of food yeast is suggested by Sure.

The many authoritative reviews on the subject of protein which have appeared in recent years in *Nutrition Abstracts and Reviews* have routinely been noted in this JOURNAL.[2] The latest in this series, on the nature and physiological significance of protein storage in the adult animal, is abstracted on page 152 of this JOURNAL.

Thus the story of protein has been recounted to date—a story in which some of the future possibilities for this essential component of the human dietary may be discerned.

ARMY AWARDS TO MEMBERS OF THE ASSOCIATION

Two other members of the American Dietetic Association to be awarded the Bronze Star, in addition to those previously mentioned in this JOURNAL, are Lt. Col. John M. Welch, and Lt. Mary M. Richert, Medical Department Dietitian.

According to a press release, Colonel Welch was selected to install the accommodations and to supervise their operation when the Ninth U. S. Army was called upon to provide accommodations for the now famous "T Force" of scientific investigators whose skilled analyses of German industry, economics, technical developments, transportation and armament played such an important part in winning the war.

Starting with five residences which had escaped with only minor damage the fearful allied air attacks which had effectively eliminated all the leading hotels in Braunschweig, Germany, Colonel Welch selected and trained a staff of soldiers and German civilians, secured and installed equipment, devised booking and accounting systems to fit the particular needs of the establishment, and opened the "Target Visitors Camp." The success of the entire operation is outlined in a letter from G-2 (Intelligence) to G-1 (Administration), both of the Ninth U. S. Army, which is quoted, in part, as follows:

> The problems raised by the above (a directive from higher command ordering the establishment of accommodations for specialists from the U. S. A. and British Ministries and Research Agencies visiting the area of the Ninth U. S. Army to investigate intelligence objectives) were novel and in many respects called for the exercise of initiative and ingenuity. The visitors were of high standing in scientific and military circles, and many were from countries other than the U. S. A. An opportunity for a tangible contribution to better relations among the allied nations was thus presented . . . It is desired that the unit responsible for the excellent service rendered be notified of the appreciation which has been the uniform reaction of all visitors, and of the substantial contribution which the Target Visitors Camp has provided in the accomplishment of the Intelligence mission in Germany.

Previous to his selection for the above-described mission, Colonel Welch's battalion took an active part in the Battles of the Rhineland and Central Europe.

Members of the Association will remember Colonel Welch as the capable director of the exhibits of the Edison General Electric Appliance Company at past conventions. While he was a student at Cornell University, he was American Hotels Association Research Assistant in Hotel Kitchen Fuels and conducted original research in that field. He is also a member of the Cornell Society of Hotel Men. It is of interest, too, that Colonel Welch's father, John W. Welch, was the first president of the National Restaurant Association; while his wife, the former Alice Keller, was a hospital dietitian prior to her marriage.

Lieutenant Richert, of Clay Center, Nebraska, was awarded the Bronze Star for meritorious achievement in the Netherland East Indies. The presentation was made by Col. William Lewis, Jr., station commander, Harvard (Nebraska) Army Air Field, November 13, at an "Officers' Call," all base officers attending.

The citation for the award read in part as follows: "Despite a shortage of personnel and a heavy census of patients she succeeded in maintaining the highest standards for preparation, variety and palatability of food." Lieutenant Richert's unit, the 105th General Hospital, cared for large numbers of medical and surgical casualties from the South Philippines and Luzon campaigns. Her work as head hospital dietitian during the period from November 7, 1944,

[2] The Protein Requirements of Lactation, S. Morris, 1936; The Determination of the Protein Requirements of Man, I. Leitch, and J. Duckworth, 1937; Quality and Quantity of Protein in Relation to Human Health and Disease, D. P. Cuthbertson, 1940. (Reprints of these review articles are available at 1s. each from the Secretary, *Nutrition Abstracts and Reviews*, Rowett Institute, Bucksburn, Aberdeen, Scotland.)

to May 12, 1945, when the unit was stationed at Biak (an island off the north coast of Dutch New Guinea), was cited as "an important contribution to the morale, well-being and proper care of the sick and wounded in the Southwest Pacific area."

Lieutenant Richert, a graduate of the University of Nebraska, specialized in the preparation of dehydrated foods during service overseas, having found the hospital plentifully supplied with this type of ration. According to the news release, her main problem was to see that the patients, who often numbered more than 2000, ate enough nourishing foods despite the equatorial heat to restore bodies weakened by months of combat rations.

Member of a pioneer Nebraska family, Lieutenant Richert is now on terminal leave before assuming a civilian position as dietitian at Yale University.

EFFIE I. RAITT

Effie I. Raitt, Director of the School of Home Economics at the University of Washington, Seattle, died of a heart attack on December 4, 1945. She had been an active member of the American Dietetic Association since 1919, and served for two years as Vice-President. Prior to the assumption of her duties at the University of Washington in 1912, she was a dietitian at Massachusetts State Sanatorium and St. Luke's Hospital, New York, and House Director at Northwestern University. Her vision and high standards for the development of the broad field of home economics served to intensify her interest in the growth of that special phase, dietetics, which had been her earlier profession. She participated in the organization of an administrative dietitian training course at the University of Washington under the auspices of the School of Home Economics, and was joint owner of the Persian Dining Room in Seattle, which was established to give commercial training as a part of this course.

The Effie I. Raitt Library was founded in the School of Home Economics at the University of Washington by alumnae in 1938, as a tribute to her twenty-five years of notable leadership.

Both the Bachelor of Science and Master of Arts degrees were conferred on Miss Raitt by Teachers College, Columbia University. She was a member of Omicron Nu, Iota Sigma Pi, and Sigma Xi. She served as chairman of the Household Management Committee of the President's Conference on Home Building and Home Ownership in 1931, and was President of the American Home Economics Association in 1934–36.

In the words of one of her close associates, Margaret Terrell, "Memories of the sincere cordiality of her friendship, and the wisdom, courage and unselfish devotion of her leadership, touch the hearts of those who knew her like an inspiring benediction."

Current Comment

FOOD SERVICE IN AN UNRRA CAMP IN EGYPT[1]

KATHLEEN VAN CLEFT[2]

Young people sauntering, old people trudging, children running, each with pails made from tin cans and a bag or square of cloth. All are going in the same direction. The wind whips the aprons of the old women, flaps the brief skirts and long bobs of the little girls. The boys, all brown backs and legs, toss up the sand with their bare toes as they play a kind of football. They keep coming from rows and rows of tents on their way to the large central kitchens. These are the refugees who, thin, ragged and dirty, were evacuated a year and a half ago from the Dalmatian coast and islands by the British Army to places of comparative safety in Africa. There MERRA camps were established and taken over by UNRRA in May 1944. Other refugees are in Palestine, Iraq, and India. They are being slowly repatriated.

In order to understand the food problems and service in an UNRRA camp it is necessary to have an idea of life there. The people are housed in tent cities scattered over a waste of sand and are fed from central kitchens. El Shatt, the largest Yugo-Slav camp, at its peak had 30,000 refugees. The camp is divided into seven smaller camps, each with its commandant, welfare officers, medical staff, public health officer, and sergeant from the British ACC (Army Catering Corps).

The main idea of the camp is to help the people to help themselves and for this reason the staff is small, working through and with the refugee committees. Each camp is divided into blocks. There are small block committees, a camp committee, and the central committee with authority over all the camps. These committees act as a kind of governing body; they also select workers and assist in the distribution of all supplies.

The welfare department deals with general camp problems, supervises the work of the shops, such as cobbling, sewing, carpentry and tinwork; plans clothing distributions; supervises the old people's home; cares for the orphans; and handles individual welfare problems.

There are schools for all the children, who take their education in shifts because of lack of facilities and teachers. At first the schoolrooms consisted of tents bare of all equipment or furniture—the children

[1] Approved for publication by the Director, Health Division, UNRRA, MEO, September 26, 1945. Submitted for publication October 1, 1945.

[2] Shortly after this article was written Miss Van Cleft, a member of the American Dietetic Association, left Egypt for Greece where she is continuing her duties with UNRRA.

learned to write in the sand! Even now, books and paper are still scarce. The schools and other groups give entertainments, and each camp has a fine choir which gives concerts.

The medical program is quite comprehensive. The public health nurses hold baby and prenatal clinics and supervise the work of the tent visitors who are Yugo-Slav girls trained here to do follow-up work on hospital discharges, and who report illness and unsatisfactory condition. Doctors hold clinics twice daily in the M.I. tents. There is a sick bay of 30 beds in three camps, to care for those with minor illnesses or for patients requiring periods of observation. Severe cases are sent to the main hospital.

Fine work has been done by the nurses in training Yugo-Slav nurse's aides in the main hospital. They have regular classes and do much of the work on the wards. As a part of their training they are assigned to the M.I. tents and sick bays.

The food service of the camp, introduced by the military forces, is managed by the people themselves. The food is a modification of the British Army ration and is obtained from the same sources. Certain items of meat, fresh fruits and vegetables, and bread are delivered daily to each camp where they are apportioned to the various block kitchens according to the numbers served. Bread for the whole camp is made in the local bakeshop by the people themselves.

Dry rations are delivered to the kitchens weekly. The refugees have been trained to take charge of this and also of each kitchen serving around 1000 people. The people work in shifts, changing each two days.

The kitchens themselves are almost the only permanent buildings. A small storeroom and a vegetable room are partitioned off. The remainder is one large room with 6 or 8 heavy-duty ranges in the center. Along a side wall or in an open courtyard is a battery of Soyer stoves, which look like rows of 34-gal. garbage cans with chimneys at the back and a door to a small firebox in the lower front. A large kettle fits in under the lid. These stoves are indispensable, as practically all the food is prepared in them—tea, soup, meat, vegetables. In addition, almost any fuel can be used for their operation. Oil is the most common fuel here, for wood and coal are practically unobtainable in the desert. The menu must be made with these stoves in mind as they must be used over and over again in preparing one meal. Aside from the stoves and some large knives, the only mechanical aid is one ordinary hand-operated food chopper per kitchen.

The rations are distributed to the kitchens, to be prepared in the manner to which the people are accustomed. They are especially fond of bread, vegetables, fish, tomatoes, cheese, and tea with lots of milk and very sweet. They do not receive fish on their ration, however, as it is not available in sufficient quantities. The adult ration per day is as follows:

Bread	14 oz.
Flour	2 oz.
Meat, fresh, boned	3 oz. (*6 times weekly*)
Eggs	2 (*once weekly*)
Rice	1 oz.
Potatoes	6 oz.
Vegetables, fresh	6 oz.
Onions	$1\frac{1}{2}$ oz.
Macaroni	2 oz.
Peas or beans	2 oz.
Fruit, fresh	4 oz.
Fruit, dried	$\frac{1}{2}$ oz.
Cheese	1 oz.
Oil, cooking	1 oz.
Milk, evaporated	2 oz.
Jam	$\frac{1}{2}$ oz.
Margarine	1 oz.
Tea	$\frac{1}{8}$ oz.
Coffee	$\frac{1}{4}$ oz.
Sugar	$1\frac{3}{4}$ oz.
Salt	$\frac{1}{2}$ oz.
Pepper	$\frac{1}{100}$ oz.

A typical menu follows: *Breakfast.* Tea, bread, margarine, marmalade. *Dinner.* Soup with macaroni or rice, meat stew, potatoes, noodles or dumplings, fruit. *Supper.* Soup, vegetable, cheese (about twice weekly), bread, tea. Practically all the milk and sugar rations are used in the tea.

When foods to which the refugees are unaccustomed are distributed on the ration, it takes persuasion and imagination to get them to use them. Oatmeal, for instance, was finally put in the soup in place of rice as they are not accustomed to eating cereals. Their food is good but shows little variation. Most vegetables are boiled, with oil poured over them just before serving. Meat is stewed or roasted.

There are modifications of the ration for children up to 10 years of age. They receive more rice, and milk and cocoa instead of coffee and tea, but generally less of the other rations. An effort has been made to have the food for children prepared separately by special cooks, using less oil and fat.

Special diet kitchens have been opened in two camps. These are completely under the jurisdiction of the medical department, and food is prepared for sick bay, the old people's home, and out-patients having special dietary needs. The food here is served only on doctors' prescriptions for specified periods. The kinds of diets are limited by the small amount of equipment available and the food on the regular adult ration. A small additional cash allowance is made with which eggs and vegetables are purchased locally. The kinds of diets are convalescent, soft, liquid, low fat, salt poor, diabetic, and diets for post-diarrhea cases, adult and children. Supplementary food for weaning babies 6 to 12 months is prepared and served from the baby clinic twice daily along with the milk and formulas. Special food is prepared for all the children up to 2 years and served from the diet kitchen before the regular diets are served.

The general health of the people in the camp is

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good. In fact, a great change can be seen in the height and weight of most of the children since their arrival. Working here and helping with the gradual development of the camps and their projects has been a most interesting experience.

STANDARDIZATION OF FOOD AND RECIPES AT HARDING'S

STELLA ROUSE WILLIAMS

The Harding Restaurants, 21 South Wabash Avenue, Chicago

Back in 1904, the first of the Harding Restaurants was opened. This was the first of the eleven restaurants now operating in downtown Chicago. At the present time these restaurants serve 30,000 persons daily. If a restaurant business is to grow and become successful, high standards are necessary. The late Mr. John P. Harding, the founder of the chain of restaurants, was an advocate of high standards and was untiring in his efforts to attain them.

Perhaps the Harding Restaurants are best known for their corned beef. This was the specialty on which their reputation was built. At one time, early in Mr. Harding's career, when he was unable to buy high quality beef, he opened a wholesale meat market in order to obtain beef which would be consistently good. Until his time, no thought had been given to meat grading. After the careful purchase of the best beef, he perfected his own corning process, the proper cooking methods, and the correct methods of carving and serving this famous dish.

Standardization has paid excellent dividends in building and establishing a good reputation. Standardization is also of value from an economic standpoint. In a restaurant, standards need to be established for the preparation of food. Waste may be due to poor standards or grades of materials used. This one factor, alone, may cause a loss of as much as 10 per cent of the yield. Also, loss may be caused by incorrect cooking temperatures and methods. Overcooking in itself may be responsible for a loss of 25 per cent of the yield. Standard portions and standard prices are necessary, for each guest should receive a uniform portion at a uniform price. Standard portions may be controlled by the use of standard cups, ladles, scales, spoons or scoops. It is the duty of the Standardization and Testing Department to establish standard portions and costs, and to teach employees the necessity of living up to them. A very great factor in the problem of elimination of waste of food is the use of standard recipes, because this takes all the guesswork out of cooking, and leaves less chance for failure. The use of standardized recipes ensures our guests a uniform product at all times.

Standardizing methods in corned beef preparation was the beginning of the standardization program now in effect at the Harding Restaurants. Always the best ingredients are purchased and the best available cooks procured. But good ingredients and good cooks do not turn out similar products. For years, little thought was given to the similarity of the food in the restaurant as a whole. The main objective was that the finished products be of high standard. Hence, we felt the need of a program of standardization for products, prices, portions and recipes. Before inaugurating such a program it was necessary to determine, as in the case of the corned beef, just what should be considered grade "A" for all the products, in the opinion of the selected judges.

All food products to be used in the restaurants are tested in the Standardization and Testing Department. Before the food item is to be used in any of the eleven restaurants, it must have the approval of this group of home economists.

All canned goods are tested for weight and quality and compared with other brands. The contents of the cans are drained and a record is kept as to solid and liquid weight. For example, in testing canned tomatoes, the purchasing agent is notified of the date the test is to be made. He asks the purveyors to have their samples in the testing office by that date. The labels are removed from the cans and each can is given a number. The liquid and solid contents are weighed. The five judges are given score sheets and are asked to score for: 1. General appearance. 2. Color. 3. Flavor. 4. Drained weight. 5. Absence of defects. 6. Tenderness. 7. Uniformity of product. The product receiving the highest number of points is the brand of tomatoes selected to be used at Harding's. At no time does the price of the tomatoes or the brand or label enter into the selection. Each product used at Harding's is given an equal amount of testing.

When an entirely new product is to be introduced, it must first be brought to the attention of the testing department. There it is tested, this time on its own merit, since it is alone in the field.

Whether a firm has one restaurant or several, standardization is a most necessary feature of the business, for business and reputation are built upon the customer's approval of the food served. These customers expect to have and should have this food served to them as tastily today as it is served tomorrow. In order to ensure such uniformity one must have standard recipes. A firm should also have a continuous up-grading program, the growth and expansion of which are matched by quality of food.

A standard recipe, once mastered, is a cook's best friend. But in some cases at Harding's, the cooks preceded the recipes. Therefore those dishes for which the restaurants have become famous have had to be put into recipe form. We did not want to

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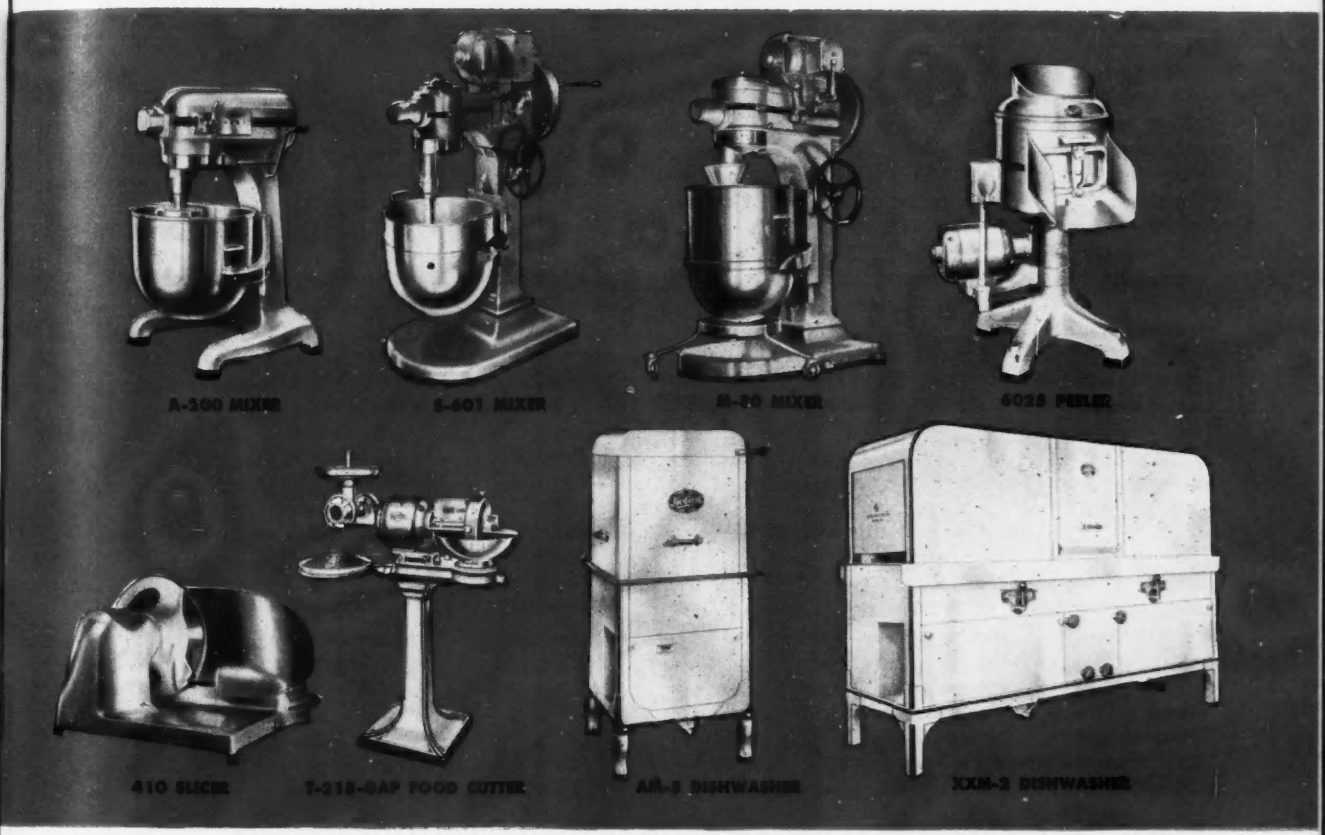

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change the dishes, but we did want the recipes for those dishes standardized.

The nutritionist responsible for the standardization of the recipe for vegetable soup, for example, may find it necessary to hover over the cook, jotting down the ingredients as she puts them in the soup kettle. It means observing every detail and observing all methods of handling the ingredients. It requires personal supervision the next time the cook makes this particular type of soup. This time the nutritionist comes "armed" with scales, measuring cups and spoons. The cook is required to measure or weigh the exact quantity of each ingredient used. When she adds the two or three cans of tomatoes, this is recorded. Likewise, the exact quantities of celery, carrots and onions are carefully weighed and cut to uniform size. In this way the native artistry of the cook who first devised the dish can be captured and duplicated by others perhaps less gifted. No stray green beans or leftover peas, I might add, are ever used in Harding's standard vegetable soup.

The third time that vegetable soup is being prepared for the menu, the cook measures and puts into the soup kettle the correct number of gallons of stock. She then weighs the correct quantities of onions, celery and carrots, and has them cut properly. (At Harding's we cut them julienne-style.) She has the tomatoes at hand, ready to add. The nutritionist observes the cook as she proceeds, and watches carefully for any variation in her method of procedure. The cook is allowed to salt and pepper the soup to taste. This is the one exception to our complete standardization program, the only instance where individual judgment is depended upon, rather than objective measurement. When the soup has cooked the required period of time, the staff of judges tastes and approves the finished product.

Then, in the clearest language possible, all the information obtained is assembled. In making a recipe, we keep in mind that the majority of the men and women using it have had little more than an elementary education. But regardless of the high or low degree of academic training of those who may use them, all recipes should be simple and clearly written.

After the recipe is typed several of the staff members read it for clearness, for each recipe must be foolproof. We then type the final copy and send it to the printer. When printed, it is added to the recipe file. We encourage and aid the cooks in the use of these recipes, and endeavor to make the using of them as easy as possible. Recipes to be used for the menu the next day are posted on a bulletin board in a conspicuous spot in the kitchen. We train a kitchen helper to weigh and measure the various ingredients.

Perhaps the question arises in your mind, why not take a recipe from a quantity cook book, and with some alterations to suit the staff of judges, set up this recipe as a standard recipe, for all the eleven cooks to follow? That procedure would be far more simple, but the finished product would not be Harding's food. Over a period of 41 years there are specific dishes, such as wheat cakes, corned beef hash, and Maryland chicken, for which the restaurants have been noted. Thus it is necessary to put these recipes into standard form, in order to pass them on to future Harding cooks.

We do have many new dishes which we add to our recipe file from time to time, recipes which are new to the restaurant and new to the cooks. The procedure in the case of a new recipe is far more simple. We take a recipe that is a favorite of one of our guests or of one of our employees, or perhaps one based on "how Mother used to make it." These, of course, are in family-size proportions and the first time they are made, they are made in a small quantity. After testing the finished product, if the staff of judges thinks it feasible for use in the restaurant, we double or triple the family-size recipe and serve it to our customers. It is interesting to watch these new dishes grow in popularity. Each succeeding time the dish is served, additional quantities must be made. Many of these new dishes which were "born" during the years of World War II have become standard items for our menus in this postwar era.

A copy of the standard recipe for Harding's Corned Beef Hash is included with this paper. In making up a standard recipe, there are a number of suggestions which are helpful: (1) List the ingredients in the order in which they are to be combined. (2) See that the abbreviations are easily read. (3) Avoid fractions as much as possible when listing ingredients. (4) Give the exact quantities by measure, rather than by weight, if the use of measure is easier. (For example, "2 tablespoons of sugar" which requires the use of a measuring spoon is far more simple than having the recipe state, "Add 1 oz. sugar.") (5) Keep the cook or cook's helper always in mind while making these recipes, so that following the recipe will be easy and simple for them. (6) The *method* for combining and cooking the ingredients of the recipe must be written in a most explicit manner. (7) The yield is important, and may be stated in pounds, quarts or gallons. (8) The cost per pound, or the cost per gallon, written on the recipe card is a valuable aid, but only of help when the price is accompanied by the date.

The best method for distributing all the findings of the Standardization and Testing Department is by means of a weekly bulletin. These bulletins are mimeographed on note-book paper, with note-book covers provided for each restaurant. They serve to bring to the attention of the eleven restaurant managers and their department heads all new products to be used, what fruits and vegetables should be

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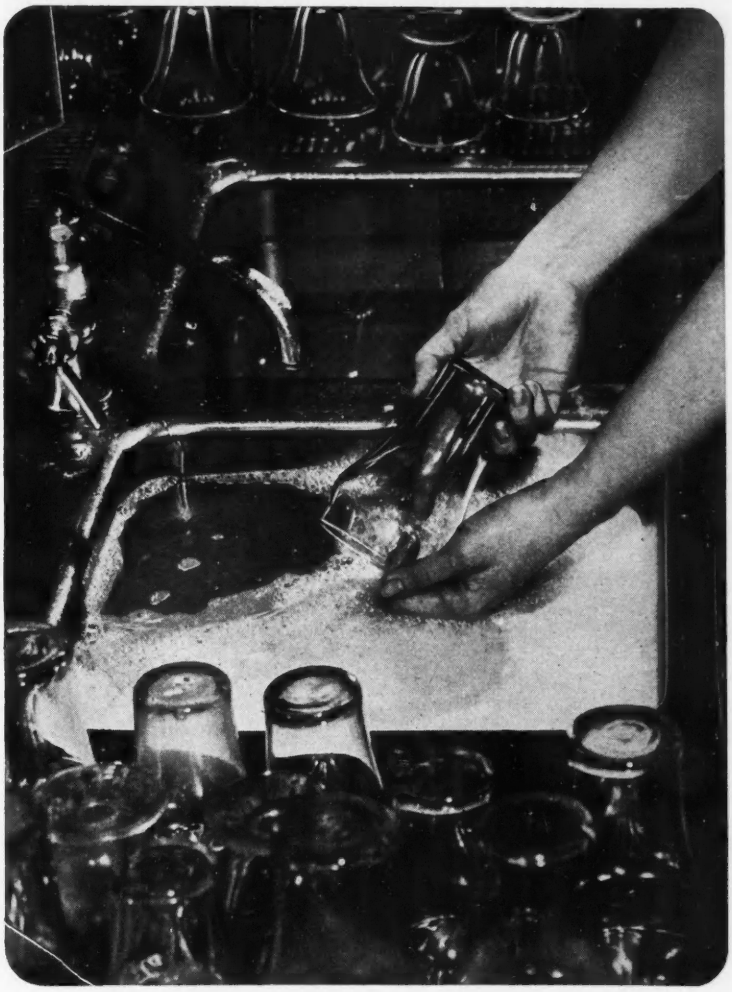

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featured, when to put strawberry shortcake or baked apple on the menus, what new recipes are in the process of standardization, etc. They contain a fund of material, information that is necessary in order to make the several restaurants operate as a whole, and to help knit the various units together into what the Harding employees like to call themselves, "the Harding Family."

MEAT 4 *Harding's Corned Beef Hash* Cost per lb. .16

YIELD	3¼ Lb.	13 Lbs.	26 Lbs.	32½ Lbs.
Cold Corned Beef	1 Lb. 4 Oz.	5 Lbs.	10 Lbs.	12 Lbs. 8 Oz.
Cold Boiled Potatoes	1 Lb. 6 Oz.	5 Lbs. 8 Oz.	11 Lbs.	13 Lbs. 12 Oz.
Uncooked Green Peppers	1½ Oz.	6 Oz.	12 Oz.	15 Oz.
Uncooked Pimientoes	1½ Oz.	6 Oz.	12 Oz.	15 Oz.
Braised Onion (simmer in butter)	½ Lb.	2 Lbs.	4 Lbs.	5 Lbs.
Salt	½ tsp.	2 tsp.	4 tsp.	5 tsp.
Dry Mustard	¼ tsp.	1 tsp.	2 tsp.	2½ tsp.
Pepper	¾ tsp.	3 tsp.	6 tsp.	7½ tsp.

METHOD:

1. Remove fat from meat. Put meat and potatoes *alternately* through food chopper. (Do not grind too finely.)
2. Add chopped green pepper, pimiento and onion.
3. Season with salt, mustard and pepper.
4. Blend all ingredients together but do not knead.
5. Place hash in steam table pan and bake in 400°F. oven 15 to 20 minutes.

Serve 5 oz. for .20 Cost per serving .05 September 9, 1940

Appointments, Army Medical Department Dietitians

The following Medical Department Dietitians were appointed during the month of December 1945.

Frederickson, Eleanor: Montana State Univ.; McCloskey G. H., Temple, Texas.
Meilicke, Naomi E.: North Dakota State Coll.; McCloskey G. H.
Roberts, Edith: Iowa State Col.; McCloskey G. H.
Rugaard, Karen: Coe Coll., Iowa; O'Reilly G. H., Springfield, Mo.

Promotions, Army Medical Department Dietitians

The following Medical Department Dietitians were promoted during the month of December 1945. They are on duty in Army hospitals in this country and overseas.

First Lieutenants to Captains

Green, Charlotte B., R-262
Farley, Eleanor P., R-1053
Moehl, Adele M., R-91
Thompson, Delma F., R-342
West, Gloria G., R-99

Second Lieutenants to First Lieutenants

Allen, Florence L., R-2114
Ashley, Bertha B., R-1290
Breimyer, Mildred E., R-2058
Brewer, Dorothy J., R-1348
Claussen, Vera E., R-1285
Cook, Carroll M., R-1316
Cummings, Elizabeth M., R-1313
Delaney, Isabelle, R-1125
Kossove, Harriet R., R-980
Lohmann, Frances V., R-2215
Loughridge, Catherine B., R-2064
Rea, Betty C., R-2311
Skellchock, Julia V., R-1356
Sutton, Helen S., R-2051
Walz, Renee A., R-1318
Woodruff, Virginia, R-1227

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Army Medical Department Dietitians Separated From the Service

The following dietitians have been separated under the provisions of the Separation Policy established by the Surgeon General for Medical Department Dietitians.

Captains

Amour, Anita D., R-184, Bentley, Kans.
Boelts, Ethel I., R-630, 1513 N. Wheeler, Grand Island, Nebr.
Boyett, Dorothy E. A., R-65, Bear Lake, Mich.
Claybrooke, Charlotte P., R-107, Scottsboro, Ala.
Hansen, Jeannette F., R-331, Humboldt, Iowa.
Meyers, Mary J., R-25, 122 E. Ninth St., Ames, Iowa.
Waldman, Eleanor, R-119, 128 Kearney Ave., Perth Amboy, N. J.
Wick, Ardeth J., R-32, 836 Western Ave., Waterloo, Iowa.
Wiley, Ruth A., R-46, R.F.D., Ringsted, Iowa.

First Lieutenants

Allbee, Elizabeth E., R-82, 215 E. Arrow St., Marshall, Mo.
Ames, Virginia L., R-861, 421 E. Clay St., Roadhouse, Ill.
Amos, Helen M., R-185, 515 S. 31 St., Omaha.
Anderson, Margaret L., R-207, Route 3, Post Garza, Texas.
Andrews, Beth E., R-669, 4114 Stonewall, Greenville, Texas.
Arthur, Margaret L., R-1000, 41 Baird St., Asheville, N. C.
Bartlett, Marian, R-1055, Alma, Nebr.
Becker, Beryl G., R-931, 1308 W. 3rd St., Waterloo, Iowa.
Beyer, Audrey A., R-1189, 2338 N. 61 St., Wauwatosa, Wis.
Bier, C. Margaret, R-899, 2030 Pierce Mill Rd. N.W., Washington, D. C.
Billyeald, Jane E., R-92, Lake Geneva, Wis.
Bilson, Barbara J., R-1048, 310 Oak St., Cincinnati.
Blackadar, Shirley C., R-476, Plainfield, N. J.
Bolton, Hazel W., R-404, Chickasha, Okla.
Boudeman, Maxine L., R-559, 216 W. Vine St., Kalamazoo, Mich.
Boysen, Margaret C., R-389, Pelican Rapids, Minn.
Bradford, Maxine M., R-1111, 305 N. 9 St., Yakima, Wash.
Brandon, Marialta, R-1081, 1984 N.W. Overton St., Portland, Ore.
Broadway, Virda E., R-1094, Boaz, Ala.
Carson, Maude E., R-759, Bliss, Idaho.
Carson, Ruth A.. R-307, 443 W. William St., Delaware, Ohio.
Church, Marjorie J., R-835, 1422 Kane St., La Crosse, Wis.
Cochran, Carolyn E., R-464, 1317 Glenn Ave., Columbus, Ohio.
Cooke, Nell E., R-132, Coffeeville, Miss.
Crance, Anna L., R-383, 921 Jefferson St., Clifton Forge, Va.
Crowley, Mary F., R-1118, 1100 Jackson St., Hollywood, Fla.
Cruzan, Clarah C., R-996, Route 2, Cushing, Okla.
Edwards, Lena M., R-276, Athol, Kans.
Emmons, Elizabeth J., R-710, 561 Sixth Ave. S., Clinton, Iowa.
Fowler, Sina F., R-959, Worthington, Mo.
Freeland, Mary I., R-856, Wheeling, W. Va.
Galt, Ruth Ann, R-148, Hale Center, Texas.
Garrison, Myrta E., R-302, Box 196, Mercer Island, Wash.
Gebbie, Betty B., R-1164, 5001 Rockville Rd., Indianapolis.
Geders, Margaret E., R-561, 209 Deshea Rd., Lexington, Ky.
Gillespie, Marjorie E., R-444, Lewisville, Idaho.
Gordon, Esther E., R-965, Box 867, Burlington, Wash.
Greene, Shirley G., R-888, 1035 Ninth Ave., Huntington, W. Va.
Harlan, Jean E., R-1187, 930 S. First Ave., Sioux Falls, S. D.
Harper, Florence A., R-724, 677 Narragansett Parkway, Edgewood Sta., R. I.
Henry, Joanna A., R-617, 60 Eliot St., Milton, Mass.
Hexamer, Jeanne H., R-505, Williamsport, Ind.
Hillburger, Alice M., R-101, 21 Russell Ave., Newport, R. I.
Holland, Constance M., R-306, 812 Arlington Ave., Reno, Nev.
Honeycutt, Willie D., R-711, 500 W. Montgomery, Rockville, Md.
Huber, Rita H., R-49, East Dubuque, Ill.
Hughes, Bessie V., R-1013, Box 123, Johnson City, Tenn.
Irvine, Marian A., R-1065, 718 Superior St., Watertown, N. Y.
Jamieson, Ruth B., R-1170, Glencroft, Blairstown, N. J.
Jewell, Alice H., R-129, 25 Rutland St., Providence, R. I.
Johnson, Helen G., R-143, 1415 A. St., Corvallis, Ore.
Johnson, Kay L., R-589, Legrand, Iowa.
Jondal, Dorothy E., R-839, Hayfield, Minn.
Jones, Edith A., R-136, Box 432, Roanoke, Ala.
Kallenback, Dorothy, R-471, 716 W. 31 St., Cheyenne, Wyo.
Kearnes, Ruth C., R-309, 2020 Westminster Ave., Salt Lake City.
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Kirkpatrick, Mary P., R-654, 2738 Woodbine, Evanston, Ill.
Klainer, Cecelia T., R-17, 28-23 48 St., Long Island City, N. Y.
Knickrehm, Marie E., R-510, 3100 Puritan Ave., Lincoln, Nebr.
Kusterer, Ella M., R-364, 608½ Ave. C., Fort Dodge, Iowa.
Lahr, Bernita J., R-1280, Denton, Mont.
Lantz, Marcella M., R-1172, 524 E. 26 St., Kearney, Nebr.
Latus, Celestine M., R-1007, Sauquoit, N. Y.
Levy, Shirley R., R-703, 680 Allen St., Syracuse, N. Y.
Lewis, Pauline E., R-1044, c/o Ruth Warye, 1303 York Ave., New York
Lieberman, Doris, R-477, 305 Linden Blvd., Brooklyn.
Lucas, Beatrice, R-117, 1265 Gerard Ave., New York.
Ludeman, Lois E., R-729, Wellsburg, Iowa.
Lynch, Helen L., R-552, Snow Hill, N. C.
MacRae, Dorothy M., R-919, 148 Vista Dr., Route 7, Jackson, Mich.
Makivirta, Soini L., R-809, 1629 Sixth St., S.E., Minneapolis 14.
McCurley, Lucy E., R-1031, Modesto, Ill.
McIntire, Natalie, R-1263, 636 N.E. 12 St., Oklahoma City.
McPheters, Ella H., R-834, Wakeman, Ohio.
Miller, Bernice M., R-23, 3949 13 Ave. S., Minneapolis.
Minor, Marjorie E., R-165, Marshall, Mo.
Morris, Zelma C., R-1093, 6117½ S. Racine, Chicago.
Moss, Frances E., R-1008, 4949 Rockhill Rd., Kansas City, Mo.
Murray, Margaret G., R-660, 4453 Biard Ave., So. Minneapolis.
Musil, Esther M., R-257, Blue Rapids, Kans.
Negro, Frances J., R-1056, 1903 30 Ave. W., Seattle.
O'Donnell, Mabel, R-542, Route 2, Champaign, Ill.
Oettle, Agnes M., R-1276, 44-14 Parsons Blvd., Flushing, N. Y.
Olson, Genevieve J., R-841, 1203 Second St. N., St. Cloud, Minn.
Oram, Phyllis, R-725, 45 Kenneth St., West Roxbury, Mass.
Papania, Providence, R-1061, 822 Academy St., Cincinnati.
Parker, Sara A., R-1038, 154 River St., Warrensburg, N. Y.
Polk, Vivienne L., R-247, 2350 Broadway, New York.
Pope, Janie N., R-484, Edisto Island, S. C.
Postle, Jeanne A., R-172, 2473 Southway, Columbus, Ohio.
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Reece, Dorothy H., R-277, c/o Mrs. Jack Cox, 209 S. Orange St., New Smyrna Beach, Fla.
Roberts, Lou S., R-1016, Hot Springs, S. D.
Rubin, Beatrice R., R-225, 118 Trowbridge St., Cambridge, Mass.
Rydolm, Mable M., R-348, East 1103-29th Ave., Spokane, Wash.
Sanborn, Jean G., R-1237, 168 Cedar St., Bangor, Me.
Sarry, Carmela M., R-793, 452 E. Drinker St., Dunmore, Pa.
Scholnick, Elizabeth, R-1117, 836 Glenwood Ave., Cincinnati.
Sexauer, Bernice M., R-1050, Kingston, Ill.
Shay, Helen L., R-35, 51 E. Columbus St., Nelsonville, Ohio.
Snyder, Dorothy I., R-80, 7502 W. Main St., Belleville, Ill.
Spearman, Mern M., R-1272, Seattle, Wash.
Sprague, Eleanor M., R-442, 1167 Lakeview Dr., Winter Park, Fla.
Stewart, Rosemary, R-419, 525 Superior St., Grove City, Pa.
Strom, Mary L., R-787, Whitefish, Mont.
Struthers, Charlotte O., R-393, 418 N. Fourth St., Marshall, Minn.
Summers, Ruth M., R-458, 118 N. Cordova, Alhambra, Calif.
Swan, Mary N., R-241, 232 Dahlia St., Denver 7.
Swanson, Doris C., R-6, 59 Cambridge Road, Woburn, Mass.
Tapke, Dorothy L., R-700, 12 Hempstead, Rockville Center, L. I., N. Y.
Taylor, Betty, R-827, Waukon, Iowa.
Taylor, Jean S., R-491, 5 B St., Lemoore, Calif.
Temple, Winnie L., R-176, Lorenzo, Tex.
Thor, Norma O., R-1066, Grand Rapids, Minn.
Threlfall, Coy A., R-547, 906 N. St. Francis St., Wichita, Kans.
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Weller, Betty A., R-291, Coulee City, Wash.
Westby, Lavina E., R-294, 263 W. 41 St., Los Angeles.
Wiltamuth, Dorothy, R-632, East Moline, Ill.
Wornom, Kathryn A., R-858, 224 W. 9 St., Chandler, Okla.
Yoksa, Victoria M., R-494, 553 Bank St., Waterbury, Conn.

BY Mary J. Barber OF KELLOGG'S

"SOME OF MY OWN FRIENDS DIDN'T KNOW THIS!"

Director of Kellogg's Home Economics Department Battle Creek, Michigan

A SHORT TIME AGO, when talking with some dietitians and home economists, I was amazed to find them not clear about the food value of ready-to-eat cereals.

Perhaps this should not have been surprising, because a recent survey showed that many teachers, dietitians, and doctors, did not know that Kellogg cereals either are made from whole grains or have been restored to whole-grain values of thiamine, niacin and iron. However, when I read the survey, I simply assumed it did not include people I knew, because I have been talking about Kellogg's to my friends for years!

Seriously, I do believe all of you should know these facts about Kellogg cereals.

1. DEFINITIONS OF RESTORED AND FORTIFIED CEREALS

Restored cereal: A cereal made from whole grain or from portions of a grain to which sufficient amounts of thiamine, niacin, or iron (or all three), are added to restore the cereal to its natural levels of these nutrients. (Kellogg's Corn Flakes, Rice Krispies, All-Bran, and 40% Bran Flakes, are restored.)

Fortified Cereal: A fortified cereal is one to which one or more vitamins, or minerals (or both), are added beyond the whole-grain level; or one to which a nutrient, not significantly present in the original grain, is added — for example, vitamin D. (Kellogg's Pep is fortified.)

2. FOOD VALUE OF THE CEREAL BOWL

The table of nutritional values below shows the contribution made to the day's requirements by a bowl of Corn Flakes, milk, and fruit. The calculation is made for the *entire* bowl — cereal, milk, fruit, and sugar—because cereal is *always* eaten in combination with milk, and the addition of fruit is becoming increasingly popular.

If you want the food values of the cereal, milk, and fruit, calculated individually, you may obtain these figures by writing our Home Economics Department at Battle Creek. Nutritional analyses given by the Kellogg Company are for the cereal *after* processing — just as it is eaten.

3. CEREALS AS A SOURCE OF PROTEIN

Cereal protein is highly effective in combination with milk — which is the way we always serve cereals.

4. IMPORTANCE OF BRAND NAMES

Products that have been merchandised for years under a brand name have *got* to be good. The name guarantees quality. The word "Kellogg's" assures you that the cereal is fresh and crisp, that you get the nutritive values promised you on the package, that these values are uniform, and that the cereal is ready to put on the table. (*Next month — how individual packages of ready-to-eat cereals help prevent waste in institutions.*)

Mary I. Barber, DIRECTOR
HOME ECONOMICS DEPARTMENT

SEE THE VALUES IN THIS KELLOGG BREAKFAST BOWL

KELLOGG'S CORN FLAKES (1 Ounce)
BANANA (1 Average)
WHOLE MILK (4 Ounces) SUGAR (1 Teaspoon)

	RECOMMENDED DIETARY ALLOWANCES[1]	NUTRITIVE VALUES CORN FLAKE CEREAL BOWL	NUTRITIONAL CONTRIBUTION IN PERCENTAGES OF RECOMMENDED DIETARY ALLOWANCES[1] 5% 10% 15% 20%
CALORIES	2,730	305	11%
PROTEIN	65 grams	7.4 grams	11%
CALCIUM	.9 grams	.143 grams	16%
IRON	12 mgs.	1.32 mgs.	11%
VITAMIN A Value	4,600 I.U.	543 I.U.	12%
ASCORBIC ACID	70 mgs.	11.3 mgs.	16%
THIAMINE	1.5 mgs.	.2 mgs.	13%
NIACIN[2]	15 mgs.	1.3 mgs.	9%
RIBOFLAVIN	2.2 mgs.	.3 mgs.	14%

[1]Allowances suggested by the Food and Nutrition Board of the National Research Council for 17 age- sex- and activity- groups were weighted by the estimated number of persons in each group in 1943.
[2]Allowance suggested for moderately active man, recommended dietary allowances, revised 1945, National Research Council.

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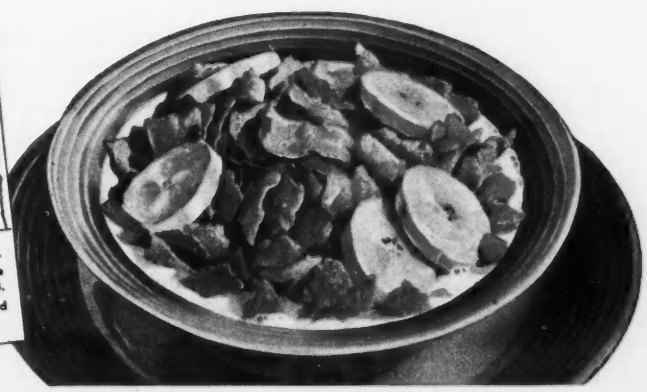
KELLOGG'S RAISIN BRAN FLAKES • KELLOGG'S 40% BRAN FLAKES • KELLOGG'S SHREDDED WHEAT AND KRUMBLES



Kellogg's

Second Lieutenants

Benson, Elinor J., R-173, 409 S. E. Oak St., Minneapolis.
Brown, Eleanor R., R-1317, 744 Fairacres Ave., Westfield, N. J.
Campbell, Mary C., R-769, 58 Wachusett St., Worcester, Mass.
Craig, Florine E., R-1262, 1517 S. 18 St., Kansas City, Kans.
Deacon, Ruth G., R-410, 413 Southern St., Corpus Christi, Tex.
Dickerson, Mary M. P., R-2171, Route 2, Ashville, Ohio.
Doll, Glennys E., R-2172, 1250 Queen St., N. E., Washington, D. C.
Draper, Venice M., R-2014, Fort Hall, Idaho.
Eaton, Margery, R-1333, 822 Chestnut St., Missoula, Mont.
Gaston, Ramah L., R-2214, 435 McLeod St., Missoula, Mont.
Gaunt, Dorothy W., R-2142, 488 Pleasant, Holyoke, Mass.
Gregory, Winifred T., R-2285, 1168 Elbur St., Lakewood, Ohio.
Leadbetter, Evelyn R., R-1302, 913 E. Cedar St., El Dorado, Ark.
Martin, Orissajane P., R-1149, 4224 Glen Albyn Drive, Los Angeles.
McGlone, Frances E., R-2086, 916 Hamilton St., N.W., Washington, D. C.
Mines, Margaret, R-854, Pocatello, Idaho.
Schrader, Ruth L., R-1241, Clifton, Ill.
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STORAGE OF PROTEIN

Previous reviews have dealt with the problem of assessing the protein requirement of man, one of which examined the problem of whether an abundance of protein is significant for health or whether satisfaction of maintenance requirements gives optimal conditions. The present review is concerned more particularly with the nature and physiological significance of protein storage.

Rubner, in 1911, classified protein retention as of the "alimentary" and "static" type. According to him, storage protein is retained or lost within 3 to 5 days after increasing or decreasing the protein intake. It is unorganized and its function is to maintain nitrogen equilibrium with an intermittent food intake. Transitional protein was believed to be organized cell protein which is deposited when the protein intake is above minimum requirement and which is more labile than the general cytoplasm. There is no doubt of the existence of Rubner's storage protein, although it would appear that his interpretation will have to be modified since the variations in storage protein can probably be accounted for, at least to a great extent, by variations in liver cytoplasm. Whether Rubner's differentiation between transitional protein, improvements protein and "organized tissue protein" is really justified, cannot be decided on the strength of the available metabolism data.

From the data currently reported, it would appear that at least two types of protein stores should be distinguished in the adult animal. In the first type N is retained or lost concomitantly with changes in dietary protein intake, causing the formation or loss of labile liver cytoplasm and probably also minor increases or decreases of the protein content of other tissues. The protein involved in these changes falls into the category of storage protein of Rubner's classification, although its function is probably not confined to that which Rubner assigned to it, *viz.*, to act as a buffer in protein catabolism. An accumulation of labile liver cytoplasm occurs only when the protein intake is, qualitatively and quantitatively, above minimum requirement. Its physiological significance is not yet understood, but it is of theoretical and probably also of practical interest that the changes in the protein content of the liver are associated with similar changes in the content of phospholipin and nucleic acids.

The second type of storage becomes evident with animals fasting for long periods, or given protein-free diets, and with animals which have lost large quantities of protein by plasmapheresis or by bleeding. Relatively large losses of protein are compatible with life, but whether it is justifiable to speak of large stores or reserves of protein being available, apart from the cytoplasm, is an open question. The chemical analyses of muscle of normal and starved animals do not support this view, although the observations on muscle of animals which had been on a protein-free diet for a long period may be interpreted in its favor.

More investigation is needed, for the old concept of an inert "store" of unorganized protein has become less likely since the recent investigations of Schoenheimer and his collaborators, who used isotopes as biological tracers, have demonstrated that tissue proteins are in a constant state of flux.—*From a review by H. W. Kosterlitz and Rosa M. Campbell, Nutr. Abst. & Rev. 15:1, 1945.*

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Book Reviews

Annual Review of Biochemistry. Volume XIV. James Murray Luck, Editor; James H. C. Smith, Associate Editor; H. J. Almquist, D. R. Hoagland, J. M. Luck, C. L. A. Schmidt, and H. A. Spoehr, Editorial Committee. Stanford University, California: Annual Reviews, Inc., 1945. Cloth. Pp. 856. Price $5.

Every director of an approved training course for dietitians should include this book on her list of essential new publications for reference use. The current volume is the largest of the series yet to be published. Of the 28 review papers presented, certain ones will be especially applicable to the dietitian's scope of interests and responsibilities: namely, those on carbohydrate metabolism, fat metabolism, the metabolism of proteins and amino acids, and mineral metabolism.

The section headed "Nutrition," by Stare and his coworkers at Harvard, deals principally with studies relating to human nutrition, with emphasis on applied nutrition as this is concerned with requirements for calories, protein, minerals, and vitamins. Considerable space is also devoted here to nutrition in medicine and public health, and nutrition surveys. The authors conclude that "in nutrition, as in all forms of human endeavor recorded in history, the gospel must and will eventually be displaced by the scientific evidence. Perhaps the greatest needs in nutritional research are adequate and objective methods for the evaluation of health."

Other sections of great interest to the dietitian include those on the water-soluble and the fat-soluble vitamins and the chemistry of the hormones.

The volume reflects excellent editorial standards and printing technique of a high order. In fact it might well serve as a standard reference on typographic and editorial style for editors and printers of scientific publications, as well as for those who wish to report research findings.

A sample excerpt from the Preface seems a fitting close to this review: "These paragraphs are being penned in early May 1945. The European war has ended. The time for reconstruction has arrived. The bonds of fraternity and understanding which, in an earlier year, united scholars everywhere have yet to be restored. So also the sense of intellectual freedom without which the dispassionate and unrestricted pursuit of scientific inquiry is almost impossible. The restoration of universities, of scientific institutes, and of their libraries should be considered an essential part of the early efforts to reconstruct a shattered world. Despite all that has yet to be done in preparation, the day of complete international collaboration in the affairs of man is again at hand."

Protein Nutrition in Health and Disease. Evansville 21, Indiana: Mead Johnson and Company, 1945. Paper. Pp. 126. No price stated.

This monograph has been reprinted from a series of nine articles on protein in the *Journal* of the American Medical Association, with the permission of the Board of Trustees. It includes the very excellent paper by Dorothea Fletcher Turner, formerly chairman of the Diet Therapy Section, American Dietetic Association, entitled "Selection of Protein Containing Foods to Meet Protein Requirements."

The Useful Soybean. By Mildred Lager. New York: McGraw-Hill Book Company, Inc., 1945. Cloth. Pp. 295. Price $2.75.

The complete story of the soybean—its history, nutritional value, production, and uses—is told in this book, written in an interesting, semipopular style and based on widely divergent sources. The historical aspects are followed by excellent chapters on soybeans and industry, and soybeans and the farmer, containing precise information about soy products and crops.

The chapter on nutritional value contains, in addition to the table showing essential amino acids in various protein foods, figures showing breakdown of carbohydrates, mineral content, composition of ash, and vitamin assays, of soybeans and flour, as well as some useful comparative figures on soy products *vs.* meat, wheat, etc., all from authoritative sources. A few paragraphs "debunking" the exaggerated claims which have been made for the soybean are inserted after this statistical material. Reasons why the bean and its products have not been generally used, and their probable future, are summarized as follows: "The protein of the soybean is not superior to that of meat or milk or eggs, as many would have us believe, nor has it any secret magic to make us young, vigorous, or beautiful. Not at all. The soybean is just a legume packed with extraordinary food value, and it should be used as such. Our trouble is that, as a consuming American public, we do not know how to use it. We have not been exposed to soy until just recently, because it has not been offered for sale in the ordinary market. It has been considered more or less as a special-diet food, and its sale has, therefore, been restricted to the specialty food shops and health-food stores. This difficulty will soon be remedied; for now the soybean has a general appeal, and already large concerns have started to manufacture and sell palatable and popular soy-enriched products. In the past, concerns specializing in soy products have usually been small and often of a religious nature, and they have not had national distribution of their products or money for extensive and educational campaigns. Because of public prejudice, the soybean, in spite of all its nutritional merits, is definitely one food that needs advertising and an educational program to make it popular. America learns through advertising. Now that our heretofore unimportant soybean has risen to fame and has gained its rightful place as a protein food that will be touched by the wand of big business, its value will soon become known, and it will find its way into the corner grocery store."

The author also believes that the soybean will have its greatest value in the diets of the future as an enriching or fortifying ingredient or, as she expresses it, a "plus element for better nutrition," which seems a logical conclusion,

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since the flavor of the bean alone seems to be distasteful to many.

As a meat substitute, soybeans may be boiled or baked, made into loaves or bologna, commercially canned or frozen, or roasted, and served hot or cold; as enrichers they supplement the proteins of meat, bread, cereal, soup, etc.; while edible soy products include the valuable soy flour, having literally hundreds of uses, and the well-known grits, not to mention puffed grits, soy butter, sandwich spreads, malts, coffee substitutes, and soy sauce. Data on these products were obtained by the author from manufacturers, government laboratories, and others. Incidentally, it is stated that the railroads in the states in which considerable acreage is devoted to soybeans have perhaps done more to further the industry than any other group. A highly successful and unique traveling exhibit on the soybean, sponsored by the Pennsylvania Railroad in 1937, is described, also one by the Baltimore and Ohio Railroad in 1941 which consisted of a complete 9-car train known as the "Soybean Special" and in connection with which two popular brochures were published and are still being distributed. The USDA and soybean processors participated in both exhibits. Other early educational efforts described include those at the Edison Institute, Dearborn, Michigan, and Madison College, Tennessee, and those of the health-food industry "which has fought for years in spite of ridicule . . . and has battled its way into the business world."

Scattered throughout the book are the names and addresses of companies and agencies from which information and recipes may be obtained. In addition, the author has included 350 recipes, some obtained from these sources. Those for soy bread, coffee cake, gingerbread, and baking powder biscuits call for 25% soy flour; bread developed at Cornell University contains enriched unbleached flour with added wheat germ, plus high fat soybean flour; soy whole wheat bread is made with 34% soy and the remainder whole wheat flour. There are, in all, 40 bread recipes, including 100% soy spoon bread and all-soy muffins. Other recipes give many variations for the use of the green or dried beans, grits, flour, soy-milk powder, etc. Many of these are inviting and well worth trying, although some would appeal only, we feel, to the soybean addict.

The use of soy products in special diets is discussed in a purely popular manner in a chapter called "The Challenge of Nutrition," with only here and there a somewhat too optimistic note such as: "The problem child, when properly nourished, will become a happy cooperative individual" (p. 120). Some general hints on improving nutrition, directed to the housewife, are thrown in for good measure from the point of view of one who has "learned the hard way, in the school of experience."

Quite evidently much time and care has been devoted to this compilation of information gleaned on the whole from dependable sources.

The Hospital Purchasing File 1945–46. Twenty-third edition. Published by Purchasing Files, Inc., 919 N. Michigan Avenue, Chicago 11. Paperboard. Illustrated. No price stated.

Replacing the former *Hospital Yearbook* first published in 1919, the present compilation contains the catalogs of more than 300 manufacturers in the 750 pages of product information. The new file is offered in answer to the requests of hundreds of hospital administrators, purchasing officials, architects and manufacturers for a cooperative volume of catalog data, prefiled and easily available. A diagram showing a typical layout for the dietary department of a general hospital by Robert J. Reiley will undoubtedly interest dietitians, as will a generous display of tray trucks, light and heavy duty food service trucks, and various models of kitchen and ice trucks.

Take It Easy Before Dinner. By Ruth Langland Holberg. New York: Thomas Y. Crowell Company, 1945. Cloth. Pp. 98. Price $1.

Written by a woman who believes that the hour before dinner should be gracious and peaceful, with no creaking of domestic machinery as evidenced by frequent and frantic trips to the kitchen, this book provides instruction in the care and feeding of husbands as well as guests. The author, it is said, with no help in the kitchen, entertains large groups at dinner and "enjoys her guests because she has learned the art of planning."

The book is also addressed to the "working girl," for whom many dishes are suggested which can be made the night before, kept in the refrigerator and baked or reheated "with no bothersome watching." In fact, all recipes calling for high temperatures (broiled chops and the like) with the attendant and permeating odor, are omitted. Mrs. Holberg simply sets down on paper and under one cover the principles which all good servantless housekeepers have practiced in advance of dinner parties: building a menu around a main dish, the component parts of which can be largely prepared the day before or the morning preceding the dinner. But no matter how skilled one may be in this respect, there are many suggestions in Mrs. Holberg's book that can be read with profit. A great many of the 120 recipes have an unusual slant, and all seem well worth a trial.

Opportunities for Dietitians in the Veterans Administration

According to a release by the Veterans Administration, January 4, 1946, the establishment of a Department of Medicine and Surgery in the Veterans Administration under Public Law No. 293, 79th Congress, effective January 3, 1946, in no way changes the civil service status of Veterans Administration dietitians. General Omar N. Bradley, Administrator of Veterans Affairs, now has the authority to establish regulations and standards governing appointment. Present requirements and regulations of the U. S. Civil Service Commission will prevail, however, until the new standards are adopted.

The release states that "Appointees perform duties as required for dietitians plus those incumbent upon the staff of a department that has full responsibility for all food service to patients. Diets will be correlated with laboratory and clinical findings. There will be opportunity for research, and under the hospital program as outlined by the Acting Chief Medical Director, Maj. Gen. Paul R. Hawley, educational programs are envisioned for the future."

Dietitians are classified as professional personnel, with base salaries ranging from $2,320 to $5,180 per year. Initial assignment is made in accordance with the stated preference. Annual leave of 26 days is allowed and 15 days' sick leave, with pay. Marriage is no barrier to service with the Veterans Administration. Student dietitians receive $1,704 a year for the first 6 months of training; $1,902 a year for the next 6 months. For further information address Chief Medical Director, Veterans Administration, Washington 25, D. C.

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Ash (total minerals) 3.8%	Riboflavin (B_2) 0.3 mg. per 100 gms.
Crude Fiber 1.6%	Moisture 5.7%
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Phosphorus (P) 580 mg. per 100 gms.	

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While the quantity of Clapp's Instant Cereal used may vary considerably for the individual, ½-oz. and 1-oz. quantities may be considered average daily amounts for the infant and young child respectively. These amounts furnish the following percentages of the minimum daily requirements:

INSTANT CEREAL: For infants, 120% of vitamin B_1; 20% of vitamin B_2. For young children, 60% of vitamin B_1; 113% of Iron; 32% of Calcium; 22% of Phosphorus.

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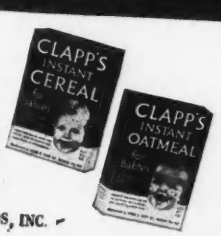

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Current Literature

Contributed by Janette Carlson and Janet Engebretsen, Dietary Department, Johns Hopkins Hospital, Baltimore; Mrs. Quindara Oliver Dodge, Simmons College; and the Journal Staff.

AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 45, November 1945

*The beneficial effects of yeast on the cardiac failure of hyperthyroid rats. B. J. Ershoff and D. Hershberg.—p. 16.

*Blood regeneration in rats deficient in biotin, thiamin, or riboflavin. A. Kornburg, H. Tabor and W. H. Sebrell.—p. 54.

*A comparison of the nutritive values of dextrose and of corn syrups and of the effects produced on their utilization by thiamin. C. P. Richter.—p. 107.

Effects of Yeast on Hyperthyroid Rats. Female rats were placed at weaning on purified rations containing 0.5 and 1.0% desiccated thyroid. Three basal rations were employed: in two of these, B vitamins were administered as synthetic factors; in the third they were present as yeast. Rats maintained on synthetic rations were extremely sensitive to thyroid feeding, with sensitivity manifesting itself in sudden death apparently due to cardiac failure. Length of survival was markedly prolonged in thyroid-fed rats receiving their vitamin B complex in the form of yeast. It is suggested that some factor in the yeast, other than the vitamins present in the synthetic rations, prolonged the survival in thyroid-fed rats, and the possible relationship of this factor to the concentration of adrenaline and adrenaline-like substances in heart muscle during thyroid feeding is discussed.

Blood Regeneration in Vitamin-Deficient Rats. Peripheral blood studies of the regeneration of red blood cells and hemoglobin, following repeated hemorrhage, have been made in rats fed vitamin-deficient diets. Biotin resulted in no significant effect on red blood cells or hemoglobin regeneration. Thiamin deficiency produced slight impairment in the rate of red blood cell regeneration. Riboflavin deficiency resulted in moderate impairment in the rate of red blood cell and hemoglobin regeneration. Anemia was noted in some riboflavin-deficient rats not subjected to hemorrhage.

Thiamin in Utilization of Dextrose and Corn Syrups. Eleven female rats of a standard age and weight survived 40 days on the average on a diet in which corn syrup (Special Corn Syrup) constituted sole source of nourishment. Eight on another corn syrup (Sweetose) survived 41 days on the average; 21 on dextrose survived 37 days on the average. The 3 groups of rats were equally active, lost weight at the same rate, ate approximately the same amount of food, and showed the same changes in the vaginal smears. When given access to a 0.02% solution of thiamin the rats of all 3 groups lived almost twice as long as those on the single food alone: 76 days on Special Corn Syrup, 78 days on Sweetose, 74 days on dextrose. They showed essentially the same activity curves, lost weight at the same rate (not so rapid as without thiamin) and showed the same vaginal smear changes. It was concluded that the 2 corn syrups have essentially the same nutritive value as dextrose and that thiamin has the same effect on the utilization.

ANNALS OF INTERNAL MEDICINE

Vol. 23, October 1945

*Absorption and excretion of iron. A. G. Little, M. A. Power and E. G. Wakefield.—p. 627.

Absorption and Excretion of Iron. In human subjects, studies of iron metabolism have always been difficult because: iron taken by mouth is apt to adhere to the mucosa; determination of iron in the stools is difficult; and the variable factor, absorption, is impossible to control. Instead of administering iron by mouth in this study, it is given intravenously; patients are kept on a diet of constant iron content. Injections of large amounts of iron caused no detectable increase in fecal iron, which is in agreement with experiments showing that the body has no mechanism for excretion of more than normal amounts of iron.

ARCHIVES OF INTERNAL MEDICINE

Vol. 76, September 1945

*Intravenous injections of acacia: clinical and physiologic effects on patients with nephrotic edema. J. B. Johnson and L. H. Newman.—p. 167.

Acacia Injections in Nephrotic Patients. In management of edema in patients with glomerular nephritis complicated by hypoproteinemia and proteinuria, treatment has never been satisfactory. There seems to be no way to stimulate production of protein so that plasma concentration will rise high enough to eliminate edema. In 1933, acacia was used to treat the nephrotic patient, but the results were not favorable. Acacia mobilizes the edema fluid and brings the plasma volume up to a more normal level. It now seems to be a valuable aid to the adult patient in eliminating nephrotic edema, especially when mercurophylline injection follows. Children do not respond to the use of acacia.

BULLETIN OF THE JOHNS HOPKINS HOSPITAL

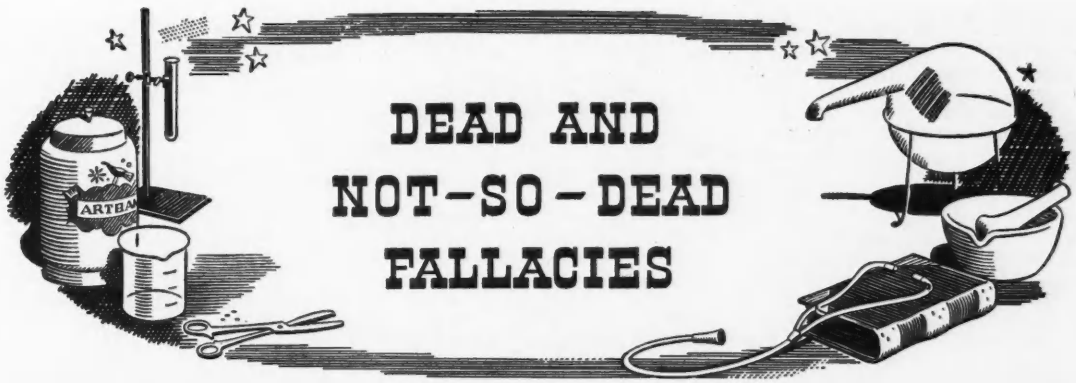
Vol. 77, September 1945

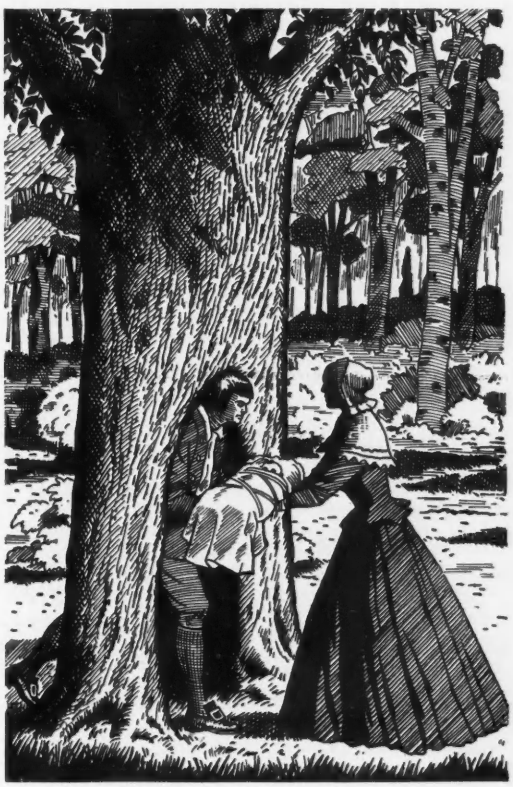
*A study of a food-borne epidemic of tonsillitis and pharyngitis due to B-hemolytic streptococcus type 5. Commission on acute respiratory diseases.—p. 143.

Vol. 77, October 1945

*Studies on patients convalescent from fracture. The urinary excretion of calcium and phosphorus. J. E. Howard, W. Parsons and R. S. Bigham.—p. 291.

Food-borne Epidemic. An epidemic of upper respiratory disease was believed to be caused by food; 100 men from 2 companies of air-borne troops were victims of tonsillitis and pharyngitis and had to be hospitalized. The source of infection was traced to creamed eggs served in the mess; however, none of the cooks had or developed the streptococcus





A CHILD afflicted with hernia, claimed the old-time "sympathetic" healers, should be passed through the cleft in an ash tree and the hernia would then disappear. This method boasted many "cures," for, as you know, umbilical hernias in babies often tend to heal themselves.

A PRESENT DAY fallacy, still widespread, is that canned foods need to be cooked. The fact is that the canning process thoroughly cooks the contents of the can, and foods need only be heated to suit taste.

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infection. The hospitalized patients were mildly to moderately ill; symptoms developed almost immediately after eating the eggs and grew in intensity for about 48 hr. Discusses the use of sulfadiazine in treating the cases.

Fracture Cases. In a series of studies on patients convalescing from fracture, diet was an important factor. The relationship of ingested calcium to urinary calcium was checked daily. From time to time, abrupt changes were made in the calcium content of the diet from high to low and in reverse order. All patients were kept on constant diets; the caloric and nitrogen ratios of the diets were approximately 1000 calories per 6.25 gm. nitrogen. Urinary excretion of calcium rises steadily in fracture patients until the period of nitrogen wastage ends, after which it remains fairly constant for a prolonged period. The sustained calcium excretion was but little influenced by dietary changes, administration of calciferol or alkalis. A discussion is included concerning the blood supply to the part of the body immobilized.

CANADIAN MEDICAL JOURNAL

Vol. 53, November 1945

*The place of protein in the diet of the pregnant patient. M. Blair, M. T. Porter and L. A. Atkinson.—p. 434.

Protein in Pregnancy. Both the pregnant woman and her unborn child need a plentiful supply of protein. The relation of water balance and edema to the toxemias of pregnancy is discussed. The importance of serum protein and its direct relationship to edema are emphasized. A diet which is relatively protein high, fat low and salt poor is presented. A method of complementary protein feeding by means of spray-dried skim milk powder is offered.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 129, December 1, 1945

*Treatment of peptic ulcer with amino acids. Current Comment.—p. 954.

Vol. 129, December 8, 1945

*Function of vitamin E. Editorial.—p. 1019.
*Tropical diseases. Editorial.—p. 1019.
Glutamic acid in epilepsy. Current Comment.—p. 1021.

Vol. 129, December 22, 1945

*The transmission of poliomyelitis by contact. A. E. Casey, W. I. Fishbein and H. N. Bundesen.—p. 1141.
*Ultraviolet lamps for disinfecting purposes. W. W. Coblentz.—p. 1166.
The term "doctor" in America. Editorial.—p. 1168.
Cancer and caloric restriction. Editorial.—p. 1169.

Peptic Ulcer. Some "rather astonishing results" have been obtained in the treatment of patients with peptic ulcer by high amino acid feedings. The prompt improvement manifest in these cases appears to be due to the protein hydrolysate, which is simultaneously an antacid and an easily assimilable food which can be built into the tissue. In the course of this work, initiated by Co Tui, the protein deficiency was demonstrated in a large percentage of patients with peptic ulcer. The treatment does not ensure against recurrences when the patient reverts to old dietary habits. Although the number of cases is small and the period of observation short, this therapeutic and supportive use of high caloric and high amino acid feedings deserves to be studied extensively by other qualified investigators.

Vitamin E. As early as 1936 attention was called to still another phenomenon of vitamin E deficiency: in rats so prepared there occurred a yellowish brown coloration of the uterus due to the collection of a pigment in the muscle of this organ. Skeletal muscle is similarly affected and here the pigmentation is associated with dystrophy. Another relationship between vitamin E and tissue pigment has been reported which is attributed to the action of the more highly unsaturated fatty acids on the ameloblasts in the absence of vitamin E. A further study of the abnormal pigmentation and depigmentation described may lead to the implication of the tocopherols in some phase of the biologic oxidative systems in the body.

Tropical Diseases. Tropical diseases threaten the health of the people of the United States sufficiently to warrant systematic efforts to identify and control them. American schools of medicine should provide adequate and required instruction in tropical diseases. In various seaports laboratories for the routine diagnosis and scientific investigation of these diseases, such as has been recently inaugurated by the Department of Health of the City of New York, should be established. Doubtless also steamship companies and airlines that are engaged in the tropical trade would embrace the opportunity to participate in programs of this sort. The United Fruit Company for many years has given commendable attention to the problems in question.

Poliomyelitis Transmission. Multiple cases of poliomyelitis in the family were the rule rather than the exception when there were other children from 1½ to 8½ years of age in the home. Poliomyelitis was found to be contagious perhaps to the degree of 90% in the 1½ to 3½ age group but less infectious in the older groups. There was no evidence that flies and other insects played a major role in the spread of the disease in the neighborhoods studied, once the disease had been introduced. Only about 1½ out of 6 instances of poliomyelitis would have been diagnosed as such, even under an alert public health reporting system, without an intensive neighborhood study. Illness in the other cases of poliomyelitis was so mild in most instances that a physician was not consulted. Present methods and criteria for the diagnosis of the disease must be revised.

Ultraviolet Lamps. While ultraviolet radiant disinfection of air can be substituted for actual air displacement in reducing cross infection in chickenpox, measles and mumps, and with less certainty in reducing the incidence of colds, there is no evidence that will justify high pressure sales promotion of ultraviolet disinfecting lamps as a cure-all or sure-shot preventive of respiratory illness. Disinfection by ultraviolet radiation can serve a useful purpose, but it has its limitations. In this connection it is a satisfaction to record that at least one manufacturer is issuing to its salesmen and distributors a printed guide setting forth factual information regarding ultraviolet disinfecting lamps and some of their shortcomings.

JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 161, November 1945

*The excretion of ascorbic acid and dehydroascorbic acid in sweat and urine under different enrivonmental conditions. J. B. Shields, B. C. Johnson, T. S. Hamilton and H. H. Mitchell.—p. 351.

Excretion of Ascorbic Acid in Sweat. Ascorbic acid and dehydroascorbic acid were determined in the sweat of 4 male subjects. The average total 24-hr. excretion of dehydroascorbic acid varied from 0.8 mg. under "comfortable" conditions to 2.7 mg. under conditions inducing profuse sweating throughout the day. The data indicate an increased skin excretion of dehydroascorbic acid following ascorbic acid dosage, and a decreased excretion of ascorbic acid.

JOURNAL OF NUTRITION

Vol. 30, November 1945

*Nutritional effects on the gastric mucosa of the rat. T. F. Zucker, B. N. Berg and Z. M. Zucker.—p. 301.
*The availability of ascorbic acid in papayas and guavas. C. R. Hartzler.—p. 355.

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Nutrition and Gastric Mucosa. Further evidence is adduced for the conclusion that in rats a rather early manifestation of calcium deficiency is found in the type of gastric lesion which occurs in the mucosa of the antrum. The changes consist of necrosis, hemorrhage, and epithelial hyperplasia. Addition of phosphate accentuates the lesions, while vitamin D administration definitely reduces their number. It is true, as others have found, that thiamin or total B complex deficiency will produce small lesions of the same type. However, while calcium increments in the diet abolish the lesions of thiamin deficiency, added thiamin has no preventive effect in calcium deficiency. The administration of neutralizing agents as such has no effect on the lesions, indicating the improbability that gastric HCl plays a role in their formation.

Ascorbic Acid in Papayas and Guavas. Papayas and guavas are unusually rich sources of ascorbic acid, surpassing even the citrus fruits. The availability of the ascorbic acid of papayas and guava juice was determined by comparing the urinary excretion of ascorbic acid by human subjects maintained on a diet low in ascorbic acid as follows: when receiving 75 mg. synthetic ascorbic acid per day; and when receiving an equivalent amount of ascorbic acid in the form of papayas or guava juice. In two experiments involving a total of 14 subjects (8 men and 6 women) no significant differences in the availability of the ascorbic acid of papayas or guava juice as compared with synthetic ascorbic acid were found. In some instances menstruation appeared to have a depressing effect on the excretion of ascorbic acid.

JOURNAL OF PEDIATRICS

Vol. 27, November 1945

•Results of providing a liberally adequate diet to children in an institution. I. Acceptance of foods and changes in the adequacy of diets consumed. II. Growth in weight and height. L. J. Roberts, R. Blair and M. Greider.—p. 393.

Results of an Adequate Diet for Children. Acceptance of Foods and Changes. The diets were supplemented for a year with all foods necessary to provide the amounts advised in the commonly accepted dietary pattern. The supplements included milk and other dairy products, eggs, whole-grain cereals, and pineapple juice. Daily records were kept of the amounts of each consumed, and a quantitative dietary study was made at the beginning and close of the year to determine the changes in amounts of various nutrients ingested by individuals. The original diets were below the recommended dietary allowances for all factors except vitamin A; those most markedly below were thiamin and vitamin C. The intakes of nutrients on the improved diet were sufficient to bring them up to and in most cases well above the allowances. The specific contributions made by the different foods are described. The acceptance of all foods was unusually good. In 94 to 99% of the instances, all these foods were accepted by the children in amounts usually equal to or in excess of the dietary pattern.

Growth in Weight and Height on an Adequate Diet. The growth in weight and height of 151 children was followed throughout a year during which the diets were supplemented with all foods necessary to bring them up to the usual recommended dietary pattern. Comparisons were made of the rate of gain before, during, and after supplementation, and also between the gains of the children present throughout and those present irregularly or for shorter periods. The beneficial effects were shown by the following: in the pre-period, the group as a whole averaged 61% of its expected gain in weight; in the supplementary period the percentage rose to 140%, and gains continued at a high level in the after-period. The gains for height followed a similar pattern. The percentage of children under average weight for height decreased, and there was a definite shift of the group toward more favorable weight-height status. By every basis of comparison the group which was present throughout, and had the benefits of the improved diet for the year, fared significantly better than those present irregularly or for shorter periods. It seems justifiable to conclude that the supplementary foods provided one or more dietary factors not present in the institution diet in optimal amounts. Until the requirements for the various essentials are better known, the desirability of providing the basic foods in amounts approximating those in the commonly recommended dietary pattern is indicated.

NEW ENGLAND JOURNAL OF MEDICINE

Vol. 233, November 22, 1945

•Nutritional defects among children in Vermont. H. B. Pierce, P. F. Fenton, W. Wilkins, M. E. Newland and P. S. Budge.—p. 612.

Vol. 233, November 29, 1945

•The nutritional status of civilians rescued from Japanese prison camps. A. M. Butler, J. M. Ruffin, M. M. Sniffen and M. E. Wickson.—p. 639.

Nutritional Defects Among Children. A survey of the nutritive status of 386 Vermont school children, selected as representative of rural and urban groups of various ages and economic levels, has been made. A review of the food intake showed the greatest fault to lie in the low intake of fruits and vegetables. Blood studies revealed that 25% of a group of 176 had plasma vitamin C levels below 0.6 mg. per 100 cc., and on physical inspection 40% of the entire series had inflammation of the gums of varying intensity. Severe forms of spongy, bleeding gums were found in only a small percentage of the children; 6% of 170 children had higher hemoglobin levels than did rural children; and skeletal changes usually associated with rickets were found in about 85%. Signs associated with a shortage of riboflavin were also found in a small percentage, but cannot be accepted as definitely indicating a deficiency of this vitamin. Some degree of folliculosis, at least of the outer aspect of the arm, was found in 40%, 5 of whom had a generalized folliculosis of a marked degree. Mild cases of follicular conjunctivitis were frequent. Premature loss of the teeth and dental caries were extremely prevalent, even on gross examination.

Nutrition of Internees. The data present information concerning rations of internees at Santo Tomas, Hay-Holmes, Bilibid and Los Banos, the nutritional status of adults, the adolescent development of boys and girls, and the nutrition, growth and development of infants and children. The rapidity of recovery of the majority of the adults from evidence of gross undernutrition and deficiencies is striking. The most frequent residual of the deficiency state is peripheral neuritis. Many, after 4 mo. on an adequate diet, still show signs of such neuritis. Several still complain of easy fatigability, dyspnea on exertion, slight edema, and impairment of vision. The gastrointestinal disturbances and exacerbation of edema incident to the abrupt shift from the inadequate diets to highly concentrated food suggest that thiamin and protein intake should be increased gradually before patients suffering such deficiencies be permitted a high calorie diet. It follows that the emergency food shipped to areas of malnutrition should be skim milk or other suitable proteins and vitamin concentrates, rather than such highly refined carbohydrate foods as white flour and sugar. In the extremely weak person, properly administered parenteral glucose, amino acids and vitamins may be required before an adequate diet can be taken orally. In view of the extremely restricted and inadequate nature of the diets ingested, the rapidity of recovery of these adults, the relatively good condition of the infants and the extent of the growth and maturation that occurred in the children justify a better prognosis for

AT WHAT AGE ARE DIETS POOREST?

As school children grow older, good eating habits tend to go downhill. With the onset of the 'teens and continuing through high school, diets reach a nutritional low, according to a recent study in nine test schools.

Whatever the causes—press of new outside interests, impatience with routines, resistance to authority—the poor quality of the average high school diet is a fact . . . one that may very well have far-reaching effects on school work habits, behavior and ability to learn.

In this study, which analyzed the breakfasts eaten by grade school and high school pupils, comparative ratings were established by expert nutritionists. Against an ideal possible score of 6.0 points, these were the ratings of the meals consumed:

In grades 1 to 8, the average rating of 3211 breakfasts was.....3.5

In grades 9 to 12, the average rating of 942 breakfasts was.....2.5

Most unfortunate, here, is the paradoxical *change* in breakfast menus. Among adolescent boys and girls, who surely need three square meals, there is seen a definite *worsening* of eating habits.

As an aid to teachers who would like to correct such trends in nutrition, General Mills, Inc. is now preparing a variety of educational materials. These are booklets, posters, plan books and other tools —all prepared under the direction of a committee of educators. This complete program will be available in limited quantities without cost, at an early date.

General Mills, Inc.

Minneapolis, Minnesota

Enriched Flours • Restored Cereals • Vitamin Products

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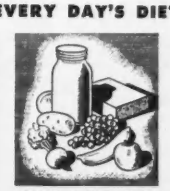
EVERY DAY'S DIET SHOULD INCLUDE THESE FOODS

GREEN AND YELLOW VEGETABLES . . . some raw, some cooked, frozen or canned. At least one serving a day.

ORANGES, TOMATOES, GRAPEFRUIT . . . or raw cabbage or salad greens. At least one serving a day.

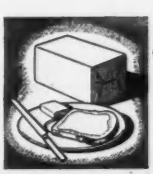


POTATOES AND OTHER VEGETABLE AND FRUITS . . . raw, dried, cooked, frozen or canned. Two or more servings a day.

MILK AND MILK PRODUCTS . . . fluid, evaporated or dried milk. One quart (or its equivalent) a day for children and expectant or nursing mothers; one pint a day for all others.

MEAT, POULTRY, FISH OR EGGS...or dried beans, peas, nuts or peanut butter. One serving of meat, poultry or fish a day, occasionally peas or beans instead. Three or four eggs each week.

BREAD, FLOUR, CEREALS . . . natural whole-grain or enriched or restored. Three or more servings a day.



BUTTER AND FORTIFIED MARGARINE . . . use for spreads and for seasoning as you like and as supplies permit.

In addition, all growing children and all expectant or nursing mothers should be provided with 400 units a day of Vitamin D in the form of Vitamin D milk (fresh or evaporated), fish liver oil or Vitamin D concentrate

such persons throughout disturbed areas of the world than that heretofore believed possible.

SCIENCE

Vol. 102, November 23, 1945

*The vitamin content of casein. M. D. Cannon, R. K. Boutwell and C. A. Elvehjem.—p. 529.

Vitamin Content of Casein. In order to obtain a quantitative measure of the amount which casein may carry, assays for 7 of the B vitamins were made on several representative samples of casein. The vitamin content of the alcohol-extracted and acid-washed casein and the crude casein is stated in table form. While only certain known vitamins have been determined, it is probable that purified casein may contain other unknown compounds which stimulate the growth of experimental animals.

SOUTHERN MEDICAL JOURNAL

Vol. 38, November 1945

*Observations on the anti-anemic properties of synthetic folic acid. T. D. Spies, C. F. Vilter, M. B. Koch and M. H. Caldwell.—p. 707.
*Nutritional deficiency as an etiological factor in icterus accompanying pneumonia in the Negro: II. Value of brewers' yeast in preventing icterus in pneumonia. M. J. Bent, E. L. Turner, G. D. Holloway and J. R. Cuff.—p. 730.

Anti-anemic Properties of Synthetic Folic Acid. The high incidence of macrocytic anemia among patients in the Nutrition Clinic, Birmingham, has stimulated not only a study of the natural history, morphology, and etiology of the disease, but has also offered opportunity for study of reticulocytosis and erythrogenesis. Numerous substances have been tested and the effects noted on the clinical progress of the patient, on reticulocytosis, leukocytic equilibrium, and red cell and hemoglobin regeneration. The substances tested included niacin, thiamin, riboflavin, calcium pantothenate, pyridoxine, inositol, para-aminobenzoic acid, choline, pyridoxamine, and pyridoxal. They were found to be of little or no efficacy in treating this type of anemia. Crude folic acid concentrates have likewise yielded no specific hematological response. Ascorbic acid was observed to cause reticulocytosis and sometimes blood regeneration in selected cases. The reticulocytosis which occurs following the administration of a synthetic substance, *Lactobacillus casei* factor, considered a part of the B complex, was studied in 5 subjects with macrocytic anemia in relapse. From the results it is obvious that persons with macrocytic anemia in relapse have a significant hemopoietic response following the administration of synthetic folic acid. In every instance the number of reticulocytes increased in the peripheral blood, and the red blood cell counts and hemoglobin content rose toward normal levels.

Nutritional Deficiency in Pneumonia. Inadequate diets, particularly lacking in vitamin B complex, render the liver of the dog more vulnerable to the effects of pneumococci when pneumonia is artificially induced. Adequate quantities of brewers' yeast added to the inadequate diet used in this experiment apparently afford marked protection to the liver in the presence of experimentally-induced pneumococcic infection in dogs. The responsible factor may be the vitamin B complex which is abundant in brewers' yeast. These experimental results parallel clinical observations on a group of Negro patients and support the conclusion reached by the authors in an earlier paper that the icterus observed in the group of Negro pneumonia patients who had been on restricted diets was the result of nutritional deficiency.

AMERICAN COOKERY

Vol. 51, November 1945

*Today's food facts.—p. 6.
Where do we eat?—at home. J. Kiene.—p. 22.
Where do we eat?—eating out. A. Kusswurm.—p. 24.
Where do we eat?—on the job. R. M. Laurance.—p. 28.

Food Facts. A new chemical was introduced during the war for use in canning foods that went to the armed forces. It is called nordihydroguaiaretic acid and is of vegetable origin. It preserves the sweet flavor of food containing animal or vegetable fats. When this acid is used, the label on the can must state that fact.

The Riegel Paper Corporation has developed an antimold treatment for bread wrappers. The wrapper of wax or coated paper is treated with an inhibitor. As the inhibitor vaporizes, it deters the growth of mold. It does not affect the bread and is odorless.

The John L. Kellogg Company has introduced a quick-frozen coffee. The coffee is roasted, ground, and percolated. Three brews are blended, then the brewed coffee is quick-frozen and condensed by a process which separates the solid from the ice with no loss of fragrance.

Caffeine is the only stimulant that accelerates the functions of the body without a depression period following. Coffee slightly increases the muscular tonus, and acts as a stimulant to the heart. Excessive amounts may cause palpitation of the heart. Since coffee and caffeine stimulate the respiration center in the brain, they are sometimes used in narcotic poisoning.

Synthetic vitamin C, when introduced into apple juice, results in a juice lighter in color and improved in flavor. It not only enriches food and beverages, but also is a protective agent against oxidative spoilage.

HORWATH HOTEL ACCOUNTANT

Vol. 25, November 1945

The trend of business in hotels.—p. 3.
Operating data for small hotels. E. P. Lee.—p. 4.
*Do restaurants need food control. H. Espersen.—p. 5.

Food Control. Food control is accomplished by means of a daily report of the ratio of food cost to sales. It extends from the purchasing of the raw material, through receiving, storing, issuing, and preparation, to service. If the food control is accurate, the manager should also include the number of covers served for the various meal periods, calculate the check average, take and reconcile the storeroom inventories at the end of the month, and make special analyses of food tests which should effect a more efficient and profitable operation. Particular care should be exercised in buying meat. Cutting tests should be made in order to ensure that the most profitable grade and trim are procured. The basis for any food control system is the receiving record. It must be accurate and provide the necessary information as to total purchases, amount of direct charges, storeroom purchases and sundry expense supplies. There should be adequate storage facilities and proper refrigeration, including a deep-freeze unit, fish box, three walk-in coolers for fresh fruits and vegetables, meat and poultry, and dairy products. The staple storeroom should have sufficient floor space and shelving. Cleanliness and orderliness are of paramount importance. Requisition withdrawals should be properly recorded. The menu is important in influenc-

Does your tableware speak well of you?

KEEP IT IMMACULATE

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IT CONTAINS 40% CALGON

NOTHING you can say about the quality of your food or the cleanliness of your kitchen will equal the deep impression made by gleaming tableware . . . Calgonite does a much better dish washing job because Calgonite contains a full 40% of Calgon* . . . makes water 100% soft . . . stimulates alkaline cleansing to vigorous activity . . . prevents film on tableware, scum or scale in the machine.

Write for free booklet containing complete instructions for better dish washing—Calgon, Inc., a subsidiary of Hagan Corp., Hagan Bldg., Pittsburgh 30, Pa.

CALGONITE* for mechanical dish washing. NOCA* for hand dish washing, glass washing and wall washing. CALGOLAC.* The new sudsless cleanser for sparkling bar glassware. *Reg. U. S. Pat. Off.*

ing the customer's first impression of the restaurant. It should be properly constructed and considerate of the public's taste. A daily tabulation of entrées should be made to determine the best sellers. Portion costs should be known for successful operation. The hidden losses in the kitchen make food costs high.

HOTEL MANAGEMENT

Vol. 48, November 1945

*Converting an all-electric coffee shop kitchen to self-service. G. J. Peppard. —p. 52.
Sandwich fillings and garnishes. L. P. DeGouy.—p. 63.
Profit plates. A. Easton.—p. 65.

Converting to Self-Service. The kitchen of the Mayflower Hotel, Washington, was changed over from a coffee shop kitchen to a self-service kitchen by placing a pantry and a garde manger counter in the kitchen. This is where the waitresses serve themselves, thus expediting service and relieving counter helpers. The doors are opened by electric eyes, the kitchen is air-conditioned and completely powered by electricity. The dish pantry ceilings are soundproofed, as are the metal tops of the counters in the kitchen and pantry. The hot food service table is novel in that each separate unit may be regulated as to temperature. The floor plan of the kitchen is given with the dimensions of each item, and details.

HOTEL MONTHLY

Vol. 53, November 1945

Packaged meats, fresh and frozen in the post-war picture.—p. 48.
Words of advice and encouragement to embryo cooks.—p. 52.
*Put out kitchen fires.—p. 74.
*Health department conducts class for food handlers.—p. 76.
*A plastic-coated fabric.—p. 77.

Kitchen Fires. The Liberty Mutual Life Insurance Company recommends the use of carbon dioxide gas in putting out fires that occur under the hood or in the ventilating duct that exhausts heat and fumes from the ranges.

Health Department Class. A 3-hour class in sanitation is conducted once a week by the Health Department, Lawton, Oklahoma. Any one can enter these classes, which include lectures and motion pictures.

Plastic-Coated Fabric. A plastic-coated, flexible upholstering material is described. This material will char when it comes in contact with flame, but will not support combustion.

INSTITUTIONS

Vol. 17, October 1945

*B/G-AMVET program trains vets for food management.—p. 1.
*Outstanding feeding installation can be improved even more.—p. 1.
*Bottled lime juice.—p. 5.
*Liquid poultry seasoning.—p. 6.
*Safety floor covering.—p. 7.
Accident prevention receives boost with standard color code.—p. 9.
*9-point check list improves operation of in-plant feeding.—p. 16.
*Steak servicing machine.—p. 19.
*Institutional linen control practiced to last lowly rag.—p. 23.
*Here's how to make good coffee every time.—p. 26.
*Pre-cut frozen meat saves Army storage space and manpower.—p. 27.
*Fruit juice glass.—p. 31.
*Constant supply of fresh milk assured by quick freezing.—p. 32.
*Walk-in frozen food units.—p. 36.
*Aluminum pre-rinser.—p. 42.
Institutional usage of frozen foods to increase five fold.—p. 47.
*Little training in use of soap keeps institutions clean.—p. 48.
*U. S. agriculture department gives rules for DDT use.—p. 49.
*New detergents.—p. 72.

Training Veterans. B/G Foods has initiated a plan for training vererans; upon completion of the course, each veteran will be capable of starting a restaurant of his own. During the 6 months in which they are in training, veterans work with the maintenance of equipment, as countermen in the service and preparation of food, and as assistant manager.

Improving Feeding Installation. Detrola Radio has found ways of improving their cafeteria built during the war. They would, for instance, place the salad counter first in the cafeteria line. The refrigerator for salads would have a door opening from the kitchen and one from the dining room. A circular bar for soup, coffee, and other items purchased to augment a lunch brought from home would deflect some of the traffic away from the main cafeteria line. The executive dining rooms would be enlarged to accommodate more people.

Bottled Lime Juice. Pure lime juice is now being bottled in 12-oz. bottles equivalent to the juice from 16 fresh limes.

Liquid Poultry Seasoning. A new liquid seasoning for poultry dressing has been introduced.

Floor Covering. A floor covering has been developed which can be sprayed on or applied by trowel and will adhere to metal, concrete, or wood surfaces, providing a non-slip surface.

In-plant Check List. Suggestions on in-plant feeding by WFA include: separate preparation of food for each shift of workers; make meal schedules conform to the needs of the majority of the workers; provide between-meal snacks to improve morale; allow 30-min. lunch periods staggered in large plants among sections to prevent long lines. Cafeterias should be well organized, mobile units or canteens strategically placed to take care of the workers without periods of waiting. Women employees especially need to have good nutrition stressed, and should be provided with comfortable rooms for rest periods.

Steak Machine. A hand-operated machine for tenderizing meat, making minute steaks, dicing, and so on is now being sold.

Linen Control. The linen supply is being controlled in one Minnesota institution by these methods: discarded linens have been dyed for use of employees in cleaning; each piece of linen has the identification of the institution and the date of purchase; a record is kept of the linen in circulation, with maids held responsible for soiled linens; a gradual replacement plan consistently prevents a sudden shortage; sheets are cut down for cots, cribs, ironing board covers and finally dusting and polishing cloths.

Coffee Preparation. The quality of good coffee can be judged by flavor, aroma, strength, clarity, and temperature when served. The water must be above 200°F. before the coffee is made and the brew should neither be allowed to boil nor to fall below 165°F. because of the changes which take place. The standard measurement is .4 oz. coffee to 6 oz. water to yield 5.5 oz. coffee. Thus a pound of coffee will yield about 40 cups.

Pre-cut Frozen Meat. The Army has been saving storage space and manpower by using pre-cut frozen meats. Storage space requirements were reduced 90% by a steamship line which tried the same procedure.

Fruit Juice Glass. A new 5-oz. corrugated fruit juice glass with a wider mouth is now on the market.

Quick-Freezing of Milk. Where fresh milk is not always available it can be frozen and held for as long as 3 months, the Army has discovered. It has been used in hospital ships and overseas hospitals. Unless frozen rapidly at a temperature of −20°F., there is a tendency for the fat to be thrown out of emulsion. Slow thawing was best, with the milk placed in an ordinary refrigerator (36–40°F.) for 24 hr. before using.

Walk-in Frozen Food Units. A cabinet is being made with 60 cu. ft. frozen food space at 0°F. and 100 cu. ft. refrigeration space at 38°F. for food storage. Both sections are thermostatically controlled.

QUESTION:

Why does lemon change the color of tea?

ANSWER:

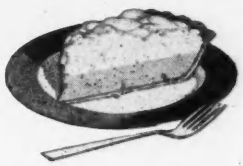
The citric acid in lemon juice changes the *p*H of brewed tea. Prepared with ordinary water, tea is neither alkaline nor acid, but is practically neutral. By adding lemon the *p*H is decreased and the tea takes on a lighter color. As an interesting classroom experiment you can now change the tea back to its original color by adding a small amount of ordinary baking soda. The soda counteracts the citric acid and returns the *p*H to the alkaline side.

LEMON JUICE HELPS ALKALINIZE THE SYSTEM

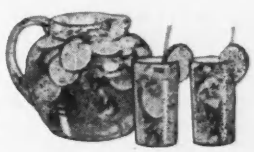
Even though the citric acid in lemon juice acts to decrease the *p*H of tea it does *not* have an acidifying action in the body. For this natural citric acid is metabolized into carbon dioxide and water, and the alkaline mineral salts found in lemons... potassium, calcium, magnesium and other valuable minerals... are left in the body to act as alkalinizers.

Sunkist *California Lemons*

LEMONS ADD SPARKLE TO EVERYDAY FOODS!



Few foods are as versatile as the fresh lemon. In baking and cooking, it is one of the three most popular flavors.



As lemonade, it is the nation's favorite fresh-fruit beverage.

But its versatility is shown most in its use as a garnish. For lemons have a marvelous knack for uncovering the hidden flavors in other foods.

Aluminum Pre-rinser. Dishes are scraped and prewashed by a spray of water, while a removable salvage basin traps silver, china and glassware, allowing the garbage to be flushed on into an enclosed mesh basket, through which a stream of water carries away all liquid, leaving the solid material clean and free from odor.

Institution Cleaning. Cleanliness is largely a matter of employee education, soap and cleaning compounds. There should be a regular cleaning schedule. Table tops and other surfaces may be cleaned daily with ½ cup soap to 1 gal. water. Specific methods for cleaning different types of floors are included.

Rules for the Use of DDT. For flies, a suspension of 5% DDT powder is effective; bedbugs, a 5 to 10% powder; mosquitoes, a 5% solution; ants, 5% DDT and kerosene spray; cockroaches, a 10% powder.

Detergents. The germicidal rinse compound used by the Army for the sanitizing of mess gear will be available soon as a detergent for institution use.

JOURNAL OF HOME ECONOMICS

Vol. 37, December 1945

*Controlling the cost of food. S. Jarrard.—p. 618.
Utah's nutrition committees carry on. P. Snow.—p. 627.
*Cereal-extended ground pork meat loaves: Their palatability. N. Hotaling and F. Fenton.—p. 629.
*Making biscuits for canning. T. Malone and J. Ketchen.—p. 640.

Food Cost Control. One of the chief difficulties of food control systems has been that system has been stressed rather than control and satisfactory results. A simplified "running" food cost control record may easily be set up and maintained through the use of a monthly food cost summary sheet, illustrated in the article.

Cereal-Extended Meat Loaves. Formulas for 15 of the most acceptable soy-extended pork loaves are given, also palatability scores for these loaves. The formula which contained the optimum amount (about 15%) of soy grits and the minimum number of ingredients scored highest after it had been frozen and stored either in the fresh or baked state. Use of long-cooking rolled oats resulted in a higher scoring product than did use of the quick-cooking variety, and 10% rolled oats proved optimum, in which case 7 gm. salt, rather than the 8.2 used in the basic soy loaf, proved sufficient. As the oats absorbed less fat than did the soy grits, the addition of salt pork was undesirable. The average score for the fresh basic wheat-extended loaf was less than that for either the soy or the oat-extended loaves. Wheat kernels toasted, ground in a Wylie mill, and passed through the largest mesh screen gave the highest scoring products. The flavor imparted by the cracked wheat purchased at the grocery store seemed stale compared with this freshly prepared product. The wheat absorbed more moisture than did either the soy grits or oats. Loaves made with a cereal mixture scored lower than did those with the oat and wheat extenders.

Biscuits for Canning. A reasonably good product can be obtained when biscuits are canned; vegetable fat produces a better canned biscuit than animal fat which tends to add a rancid flavor; single-acting baking powder is more satisfactory than double-acting, the latter tending to produce a bitter flavor. The best recipe and procedure for making biscuits are included.

PERSONNEL JOURNAL

Vol. 24, November 1945

*Memorandum to supervisors. J. W. Dunhan.—p. 192.
*Personnel research at Ohio State.—p. 197.

Memorandum to Supervisors. There are two classes of supervisors: the technical supervisor who knows not only the results required, but also the methods of doing the work to achieve results; the administrative supervisor who knows only the results required. A supervisor should have a clear understanding of the result to be accomplished before attempting to put a subordinate to work. Instructions to a subordinate should be plain, accurate, and complete. Orders may be given to produce a certain result or the method to be used may be explained. The administrative supervisor usually uses the former, the technical supervisor the latter. Where it is possible with either class of supervision, it is better to confine orders to results and leave the methods to the initiative of the subordinates. Suggestions regarding method may be given, but adoption of these should not be insisted upon. Reluctance to make decisions wastes the time of all concerned and lowers the subordinate's opinion of management. Orders that do not come from direct lines of supervision should never be tolerated.

Ohio State Research. Ohio State University has recently set up a new university-wide program of research, instruction, and technical service in the field of personnel relations in business, industry, government, and education by means of institutes, workshops, internships, and consultation with specialists. Present plans include studies on personnel practices in small business, worker attitudes, causes and methods of reducing absenteeism, and job potentialities for students and job seekers. Standards will be developed in terms of cost, results, component parts and optimum size of various personnel organizations.

RESTAURANT MANAGEMENT

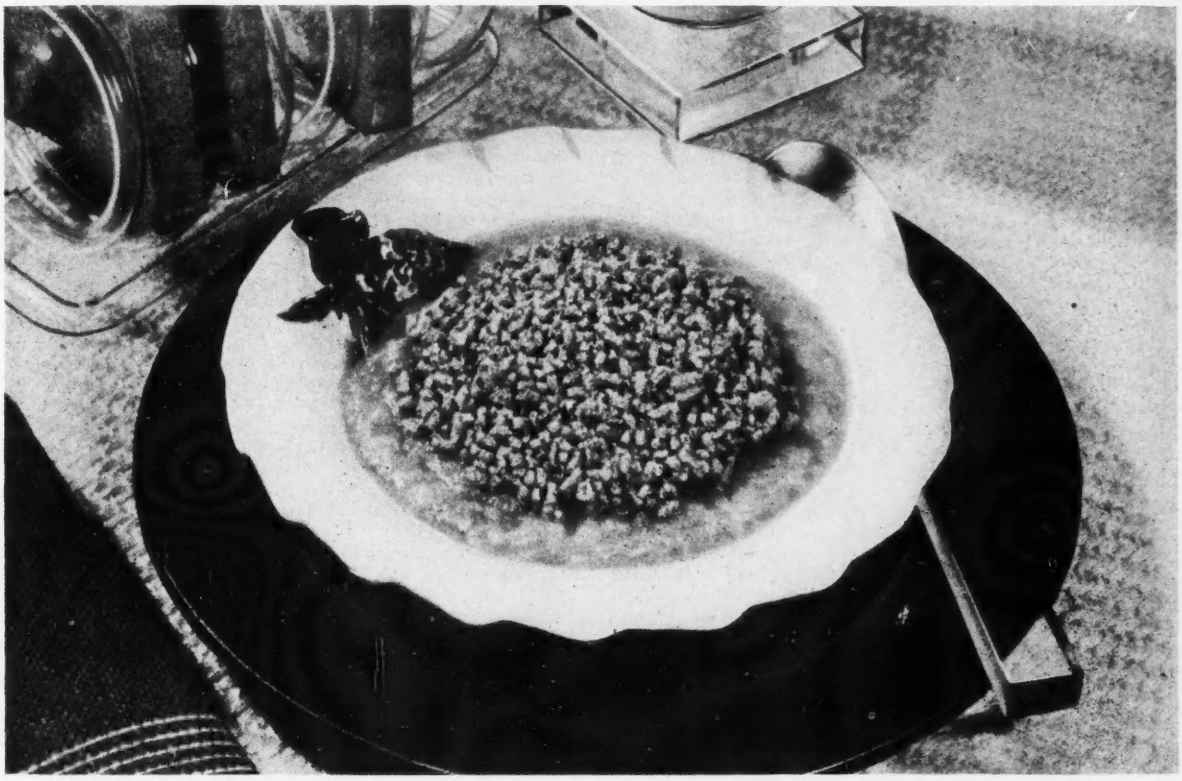
Vol. 57, November 1945

*Good food hints. L. P. DeGouy.—p. 14.
*Money making methods. F. Searing.—p. 23.
Tile's many exterior and interior uses.—p. 24.
*What 500 women want in post-war restaurant service. B. Forbush.—p. 25.
*Making the most effective use of DDT. R. Williams.—p. 27.
*Goodbye to the gremlins who gummed up wartime food service. A. Easton.—p. 28.
How to detect counterfeit money. H. Ziegler.—p. 32.
*How well the Army trained cooks, bakers, and butchers for civilian jobs. A. A. Hitchcock.—p. 36.

Food Hints. New ways of serving waffles, suggestion for using pickle liquid in salad dressing instead of vinegar, directions on how to flute bananas and use them as a garnish, a method of making vegetable soup with coarsely ground beef shin, and directions for serving soups, storing soup stock, and for the use of browned flour in making a rich-looking soup. Modern sandwiches are discussed and new ideas given.

Money Making Methods. Appreciation of loyal employees helps to pull you through crises. Untidy storerooms result in spoilage of food hidden away in the back and uncontrolled stealing and waste. Silver may be cleaned by "dunking" in a solution of salt and baking soda or a solution of one of the cleaning powders. Leaking water taps and uninsulated steam or hot water pipes waste water and fuel. Cream dressings or plain oil, vinegar, salt and sugar can be used in place of mayonnaise. To prevent heavy turnover, feed your help well and plentifully. Taking a vacation and learning to play will be an asset to the manager who has been working too hard.

Women's Food Preferences. Of 500 women interviewed, 26% eat in restaurants 2 to 6 times weekly and 25% never eat in restaurants. Of the people who dine out once a day, usually for lunch, 47% prefer table service and 44% cafeterias. For this meal, cleanliness, good food and quick service are desired. When the family goes out together, 57% want a medium-priced restaurant with good, plain food. Some of the less desirable factors mentioned were the service, quality of food, lack of variety of food, lack of provision for children and those on special diets, small portions,



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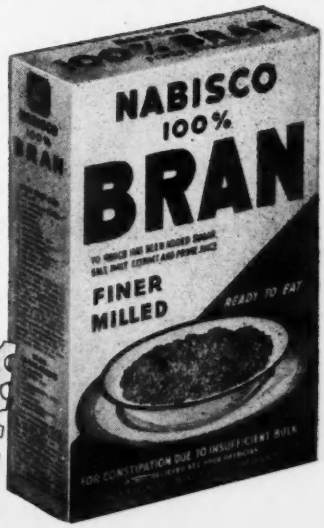

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unbalanced meals, poor sanitation, and the attitude of the help. The one thing needing the most improvement seems to be the food, with service rating second. When eating out, women prefer meat, with steak and roast beef ranking high, and pie the favorite dessert. The criticism of the food seemed to center on seasoning, monotony, overcooking, and coldness of "hot" food.

DDT. In a demonstration of the correct way to use DDT in restaurants and hotels, food and dishes were covered and a light spray was used to cover the surfaces where flies light, *i.e.*, under-surfaces, door facing and projections. Cracks, corners, sides, and faces of booths were sprayed and screens painted, and DDT-saturated strings hung where the flies might congregate. The poison is absorbed through the insect's feet and 20 to 30 min. later the fly is dead. The powder has been very effective for ants and roaches. When a restaurant is closed one day a week, spraying may be done the night before so that the fumes of the mixture will be dissipated before the restaurant reopens for service. The white crystalline compound is not soluble in water, but is used in kerosene. Very often the effect of the spray will last as long as 30 days, the length of time depending on the strength of the solution.

Food Service. The four fundamentals of good service that impress the customer are: atmosphere, cleanliness, attitude of the person giving service, and the food itself. The speed with which the food is served often depends largely on the serving room setup and the quality of the supervision in the kitchen. Rules are given for the various phases of food service, including service of soup cups and silver.

Army-Trained Cooks, Bakers, and Butchers. Army cooks, bakers, and butchers have been trained in classroom and kitchen. Cooks are trained in food preparation, from vegetable peeling to equipment, preparation methods, menus and nutrition, pastry, meat, and ice cream preparation, flavoring, spices and the service of food. Actual experience and ability may vary, but in most cases they can fill positions as short-order cooks, chief and assistant cooks and assistant chefs, and with more training they can assume supervisory capacities. The mess sergeant has been a cook and then a manager or supervisor, able to plan menus, order, account, and supervise. Pastry bakers have had instruction in ingredients, products, baking equipment, sanitation, refrigeration, and storage; the bread baker, in the use of ingredients, formulae for bread, bread manufacture, and the scoring of products; the meat cutter, use of equipment, procedures, sanitation, preparation of poultry and seafood. All can fit into civilian jobs with little if any orientation and be an asset.

WHAT'S NEW IN HOME ECONOMICS

Vol. 10, December 1945

*The mechanics of securing films. F. S. Montgomery.—p. 58.

*Training school lunch workers.—p. 87.

*Cafeteria practices in the elementary schools of Richmond, Virginia. J. H. Binford.—p. 91.

Visual Education. The following mechanics for securing films are submitted to assist teachers and for use as a self check by those already using films. Know in advance what the film teaches and the presentation level; this information can be obtained from catalogue descriptions and scope charts or by preview. In the case of films produced by commercial organizations, the sponsoring company will be able to supply comprehensive content descriptions to assist in selecting films to correlate with the unit of subject matter to be presented. Assuming that the desired film has been selected, the following conditions should be observed: Arrange for projector, operator, and screen for the date and time you wish to use film. Secure authorization for the expenditure for service fee or transportation charges if such are involved. Secure purchase order if required by your institution. Write to the bureau, library or company and supply the following information: complete film title or number, indicating whether a silent or sound film is desired, the date on which film is to be used and alternate dates that would be acceptable (do not give one or two dates in the same week as alternates for first choice; allow at least one week between first, second and third choices), title or titles of substitute films; complete shipping instructions which include name, title, address, and postal zone. In some instances instructions concerning the officer to whom bills must be submitted should be supplied. Instructions should state whether shipment should be by express or parcel post. It is essential that one plan considerably in advance for the films to be used in class. However, it is possible to secure many good films with only a few weeks' advance notice. It is also well to remember the importance of prompt return of films after the date on which they are shown.

Training School Lunch Workers. Women with a flair for cooking who have worked in school lunchrooms say the compensations of this occupation include the relatively short hours, the opportunity to add to their skills in food preparation and management and, not least of all, the satisfaction that comes from seeing the happy expressions on the faces of well-nourished children. Even the "born cooks" need to be trained in large-quantity cookery and in working with others under supervision. In-service training of workers is being carried on in connection with an increasing number of school lunch programs in large city systems and through county-wide organizations of small schools. Many methods are being used, including the individual conference, the lecture-demonstration, and the workshop. Some managers attempt to do the whole job alone while others seek the assistance of health, food and employment specialists from outside agencies and business concerns. Length of training depends upon the background and experience of the workers, as well as the amount of time which can be allotted to this activity by the manager or supervisor, who in many cases is also the home economics teacher. Training for the development and improvement of skills should be confined to those activities which are to be used in the lunch program. For instance, if a complete meal geared to the needs of a child is to be served, there is no necessity for training in pastry making. Besides teaching the workers the techniques, they should be taught to manage their time and energy, to avoid the wastes of human resources that result from lack of planning and inefficient work habits.

Cafeteria Practices. The following changes have been worked out over a period of 10 years in the Richmond elementary schools: Luncheon periods have been entirely separated from the recess or play periods. The children have been trained to select and eat nourishing food. The luncheon period has been turned into a social hour where pupils under the supervision of their teachers are taught to observe proper table manners and to engage in friendly conversation. All pupils participate in the luncheon period. Those who bring sandwiches from home sit down at the tables with those who patronize the cafeteria. Teachers and patrons have been persuaded that they have a duty in helping to make the luncheon period as educational as any other school period. The luncheon periods have been staggered in order to prevent overcrowding and to bring together children of the same age groups. Article includes descriptions furnished by a number of the elementary school principals showing how the luncheon periods are conducted in their schools.

DETAILED RESEARCH*

at 5 great American Universities establishes nutritional values of

CANNED FRUITS

*Complete report published in the August 10th, 1944 issue of The Journal of Nutrition

The evaluation tables resulting from the research project mentioned above are of particular dietetic significance for this reason: Since canned foods are processed—ready to warm or chill and eat—the nutritive values set forth for canned foods are *net* values. This contrasts with the *gross* values generally quoted for raw foods—such as fruits and vegetables—which are subject to widely varying deductions for losses resulting in transit from field to market to kitchen. Again, home preparation is often destructive of nutritive values—especially in the case of the water-soluble vitamins.

The detailed report—complete with supporting tables showing the specific nutritive values of the whole range of canned foods—was published in the August 10th, 1944 issue of *The Journal of Nutrition*.

As might have been expected, the best sources of ascorbic acid, among the canned fruits, were found to be orange juice, grapefruit juice, and grapefruit segments—in that order.

Thiamine was found in greatest quantities, among canned fruits, in orange juice, sliced pineapple, and pineapple juice—while peaches were the best canned fruit source of niacin; and carotene was found to be best provided by apricots and prunes.

Those are the over-all findings regarding canned fruits. Other advertisements in this series deal with canned vegetables, canned meats, and canned fish products.

As a reader of this publication, you play an important part in helping to form public dietary habits. We urgently request your support in disseminating information regarding the good values of canned foods in supplying nutrition at low cost. To that end, an interesting booklet has been prepared in lay language. Upon your request we shall be happy to send one or more copies for your use. Please address:

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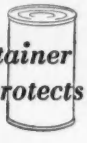

News Notes

"Your Red Cross Must Carry On." Servicemen and women still in uniform—those overseas with the armies of occupation, those yet to be discharged—continue to need Red Cross clubs, snack bars, and recreation centers, and the friendly assistance of understanding Red Cross workers. Veterans and their dependents look to the Red Cross for assistance in solving problems that often slow adjustment to civilian life. Hospitalized servicemen and veterans need help to face the tedious hours of convalescence. Disaster victims, the homeless of war-ravaged lands, and others in distress, need Red Cross help. *Give now to the 1946 Red Cross Fund Campaign.*

New Placement Service. In an effort to improve conditions for women in business and at the same time to increase business efficiency, a clearing house employment service for employers and employees is included in the plans of the New York Home Economics in Business group, affiliated with the American Home Economics Association, as announced by Blanche Stover of *Practical Home Economics*, chairman of the group. The Maude Lennox Personnel Service, 630 Fifth Ave., will handle all placement phases of the new employment-vocational guidance plans, according to a release from Betty Leaming, the Borden Company.

The Vocational Guidance Committee, with Eloise Voss, Celenese Corporation of America, chairman, will continue its work in vocational guidance. The committee includes members in each of the various phases of home economics. Sarah Reinecke, Standard Brands, Inc., represents food interests, and Elizabeth Sweeney, *McCall's Magazine*, equipment.

Nutrition Bibliography. Compiled by the Community Nutrition Section of the American Dietetic Association, this bibliography is now available from the Association, 620 N. Michigan Ave., Chicago, at 25 cents for a single copy, $4 for 20 copies, $8 for 50, and $15 for 100 copies. Books, journals, pamphlets and leaflets are listed under the following headings: Nutrition in Pregnancy and Lactation; Nutrition and the Preschool Child; Nutrition and the School Child; Nutrition and the Family; Nutrition in the Community; Nutrition in Industry. Authors, titles, publishers, prices, and annotations are given for each publication listed. Lists of films and their sources are also included.

New York State Legislative Committee on Nutrition. A public hearing of this committee was called in New York, December 12, to provide suggestions for action when the state legislature would meet in January, according to the New York *Times*, December 13, 1945. Senator Thomas C. Desmond, chairman of the committee, stated that a transcript of testimony at the hearing, which was attended by 125 invited guests, would be studied carefully before any bills would be submitted. Speakers included: H. H. Rathbun, president, Dairymen's League Cooperative Association; Edward R. Van Kleeck, director, school lunch program for the New York State Education Department; Paul S. Willis, president, Grocery Manufacturers of America; Dr. William C. Ockey, Food Distribution Programs Branch, USDA; Robert H. Bingham, Food Price Division, OPA; Dr. Robert S. Harris, Massachusetts Institute of Technology; Dean Sarah Gibson Blanding, New York State College of Home Economics; Dr. Frank G. Boudreau, National Research Council; Dr. Reginald M. Atwater, American Public Health Association; and Chester A. Halnan, Production and Marketing Administration, USDA.

A National Nutrition Program. A national nutrition program to raise dietary standards is being considered by the Truman administration, according to the "Washington Letter," *Journal* of the American Medical Association, December 8. The program is said to involve government subsidization of family supplies where there is lack of income to guarantee an adequate diet. USDA has submitted plans for raising dietary standards to the White House, which include a broader school lunch program providing hot lunches in every public school financed by federal, state and local school governments, according to this account. A relatively small number now receive lunches at government expense. Senators Aiken, Republican, of Vermont, and La Follette, Progressive, of Wisconsin, introduced a bill calling for food stamps similar to those used in the thirties to dispose of farm surpluses.

National Restaurant Association. The twenty-seventh annual convention and exposition of the National Restaurant Association will be held at the Stevens Hotel, Chicago, March 26–28. The tentative outline of subjects chosen by the convention committee is as follows: current operating problems; national controls and trends; the food outlook; personnel training and public relations; art of cooking; frozen foods, electronics, and dehydration; things to come; engineering aspects of better dishwashing; the economic outlook. Among speakers scheduled to appear are: George R. LeSauvage, president, National Restaurant Association; H. M. Ballard, vice-president, Business Research Corporation; Walter F. Clark, president and general manager, Clark's Restaurants; Percy A. Brown, president, Percy A. Brown Company, Wilkes-Barre.

Col. Paul P. Logan has been appointed by the association to direct research on new food products and processes being developed and the equipment related thereto. Colonel Logan recently was retired from the U. S. Army as Chief of Food Service of the Army Service Forces.

The December 7 issue of the National Restaurant Association *News Letter* calls attention to Section 12 (b) (1) of the OPA restaurant regulation (MRR 2) which states: "You may not drop food items from meals or reduce the quantity or quality of any meal, food item or beverage, unless you reduce the price accordingly." According to the *News Letter*, "You must therefore now offer the same amount of butter to your customers as you did in the base period, April 4–10, 1943. If because of a short available supply, you are not able to make the same offer you made in the base period, you may eliminate it if you make the appropriate reduction in

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price or you may use a substitute item and price it 'in line'. If you price 'in line' use Section 1 (b) of the restaurant regulation. A price is 'in line' if the customer gets the same value for his money in terms of quality and size of portion and if the margin over current raw food costs is the same."

In the same issue, Frank J. Wiffler, executive vice-president of the association, states that, with rationing controls lifted, a progressive restaurant operator will take inventory of his menu and make changes in items as rapidly as supplies become more plentiful. Since the public is now expecting greater values and more variety than rationing restrictions permitted, "now is an excellent time to take inventory of your business from every standpoint, improve its service and food standards and gain again the fine public relations your business once had."

Under the heading "Eat to Success," the following statement appears: "As true today as when the National Restaurant Association published its booklet, *Public Opinion and Private Profit* in 1931, the trend for people dependent upon public eating places has been to disregard the importance of a well-balanced diet. Hordes of working girls in all parts of the land bolt a couple of pieces of bread with a wisp of lettuce and a dash of so-called mayonnaise, wash it down with a soft drink and rush away to have their skins beautified. They save on lunches to buy cosmetics, when the real foundation of beauty is health, and health largely depends on food. Crowds of men clerks pour out of their offices at noon—spend fifteen cents and fifteen minutes for lunch, and fifteen cents and forty-five minutes for cigarettes. It is their opinion that this is the way to efficiency, advancement and wealth. The restaurant industry should continue to direct the public toward more nutritious eating; *create* the demand for higher standards of food through a public relations selling job of pointing out that we are selling the means of robust health, energy, endurance, and that these things mean beauty and success; not just food."

Tri-State Hospital Assembly. The annual meeting of the Tri-State Hospital Assembly will be held at the Palmer House, Chicago, May 1–3, according to an announcement in *Wisconsin Hospitals*, October 1945.

Color Slides of Other Americas Available. The Office of Inter-American Affairs reports that the Division of International Education Relations, U. S. Office of Education, Washington, has 1500 Kodachrome slides showing life in Central and South American republics available for loans. A new series of 18 loan packets on inter-American subjects is also available from the Office of Education for the use of teachers, secondary schools, college students, and adult organizations. The packets contain bibliographies, pictures, maps, units and courses of study, program outlines, games, music, conference reports, reprints of articles, and other study materials.

Veterans Hospital Sites. The first indication of opposition to Gen. Omar N. Bradley's plan to set up new Veterans Administration hospitals "where they will do the most good for veterans rather than where it is expedient for political or geographical patronage" has been revealed, according to the *Journal* of the American Medical Association for December 1, 1945. The report states that Senator Elmer Thomas, Democrat, of Oklahoma, sent a virtual "ultimatum" to General Bradley requesting that the veterans' agency take over the 750-bed Glennan Army Hospital at Okmulgee, Okla., which was then being closed. In taking a stand against "pork barrel politics," said to have been a major factor in the location of veterans' hospitals under the regime of former Veterans Administration Director General Hines, both General Bradley and his acting surgeon general, Major Gen. Paul R. Hawley, have repeatedly emphasized that the interest of the veterans comes first. The present policy calls for setting up new major hospitals in or adjacent to large urban centers so that veterans' hospitals can take advantage of teaching facilities and faculties of large medical centers.

New York Establishes School Lunch Bureau. A Bureau of School Lunches was created by the Board of Education, New York, December 27, according to the New York *Times*. Lt. Col. Harvey K. Allen was appointed head of the new bureau, which will consolidate and centralize the four school lunch services that have been in effect. The new program, it is said, will not only centralize the buying of food and the planning of menus, but will also make it easier to coordinate the service with nutrition instruction. At the same time, the position of "center director" was created by the board, whose duties would be to direct the activities of the various community centers previously performed by three people who could devote only part time to the centers. Colonel Allen is said to have had experience in industrial feeding and to have worked with the Board of Education on school lunches in cooperation with WPA.

Vocational and Professional Monographs. One of a series of monographs published by the Bellman Publishing Company, Inc., 6 Park St., Boston 8, is *Public Relations*, by Edward L. Bernays, priced at 75 cents. The contents include: a description of the profession, history and development, personal qualifications and aptitudes, scholastic training, employment opportunities, possibilities for women, professional competition, advancement, ethics of the profession, remuneration, and bibliography. Among other similar monographs available are: *Hotel Business*, by R. Huntington, *Cooking*, by Alice Bradley, and *Restaurant Business*, by Walter O. Voegele.

National Food Situation. A chart in the "1946 Outlook Issue" of the *National Food Situation*, drawn from data assembled by the Bureau of Agricultural Economics, USDA, shows that the retail value, per person, of farm food products sold to civilian consumers has fluctuated widely between 1913 and 1945. Most of the fluctuation reflects changes in prices during periods of prosperity, depression, war and inflation; but part of it is due to changes in the volume of food consumption per capita.

Food prospects for 1946 are summarized as follows: Total food available for civilians will be considerably greater than in 1945. Average food consumption per capita is also expected to be larger than in 1945, even with increases in civilian population resulting from demobilization of the armed forces. In fact, it may exceed the high record of 1944, which was 11 per cent above the prewar level of 1935–39. All foods, however, will not be equally plentiful. At least in the early months of 1946, supplies of pork, the better grades of beef and veal, fats and oils (particularly butter), sugar, and canned fish will continue smaller than demand. More ice cream, cheese, condensed and evaporated milk, fluid cream, canned vegetables, and fresh and frozen fish will be available than in 1945. Eggs and fluid milk will continue plentiful, although average consumption per person is likely to be somewhat smaller than in 1945. Consumption of chicken, turkey, fresh fruits and vegetables, frozen and dried fruits, potatoes and sweet potatoes, and cereal products probably will average substantially the same as in 1945.

Civilian supplies of some meats and fats (other than butter) will be larger than before the war, but will not be sufficient at present prices fully to satisfy consumer demand throughout the year. Meat consumption per person in 1946 is expected to reach 145 to 155 lb. wholesale dressed weight, compared with 130 lb. in 1945. The 1944 civilian consumption of 150 lb. per capita was the highest in over 30

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years. Expected strong demands for fluid milk and cream, ice cream, cheese and other dairy products will tend to prevent any material increase in butter production unless wholesale and retail price ceilings on butter are raised still further or removed. In the latter case there would be a substantial advance in the price of butter and a considerable diversion of milk from other uses to butter manufacture.

Sugar supplies should improve but will still be considerably below full consumer demand at present prices. Much larger supplies of canned fruits will be available than in 1945, but military needs will be sufficiently large to prevent civilian supplies from exceeding the prewar level. Supplies of canned fish will also increase, but military requirements and the needs of liberated areas probably will hold the civilian consumption of canned fish below the prewar average.

A chart in USDA's *Demand and Price Situation* for November 1945 demonstrated that since 1914 prices received by farmers have been more variable than average wholesale prices of all commodities and much more variable than consumer prices. Consumer prices declined relatively little following World War I and were comparatively high throughout the inter-war period. From 1939 to 1945, prices received by farmers rose 87%, average wholesale prices 30%, and consumer prices 28%, but all three are lower than in the period immediately following World War I.

The supply of sugar allocated to the United States in the first quarter of 1946, as announced by USDA, totals 1,183,854 tons, or slightly below that allocated in the October–December 1945 period, but sufficient to maintain civilian rationing at present levels. U. S. civilians, including home, institutional and industrial users have been allotted 1,100,000 tons; U. S. military and war services, 70,263 tons; commercial exports and shipments (including U. S. territories), 13,591 tons.

The world output of rice in 1945–46 may total less than in the preceding year and more than 10% less than the annual average in the 5 years prior to 1940, according to USDA's Office of Foreign Agricultural Relations. The total world crop is forecast tentatively at 6500 million bushels, compared with 6800 million the year before and 7400 million for the 1935–36 to 1939–40 period.

Acting to maintain the same relative distribution of the various package sizes of shortening, lard, and salad and cooking oils as existed during the rationing period, USDA on November 19 amended War Food Order 42 to restrict manufacturers of these products to approximately the same package-size distribution as during the rationing period.

Tomatoes and sweet corn together make up three fourths of the total tonnage of vegetables grown for processing, according to USDA. During the war the canning of green peas and snap beans increased greatly because of Army needs and heavier civilian demand. Nevertheless, the regular favorites—canned tomatoes and canned corn—continued to hold the lead in production.

This year more of the cranberry crop than usual went to canners and other processors, partly because of favorable prices, and a smaller proportion of the crop is retailing in fresh form, according to USDA. Of the processed products, canned sauce was produced in largest quantity and dehydrated berries next, to supply the holiday demand for the traditional sauce. Packers then turned to such other products as juice and marmalade.

Food Transportation Situation. No relief in the shortage of refrigerated railroad cars is seen before May, according to J. L. Pease, USDA. The situation with regard to trucks is somewhat better. A sizable amount of new equipment is expected to be available before next October's rush period, however.

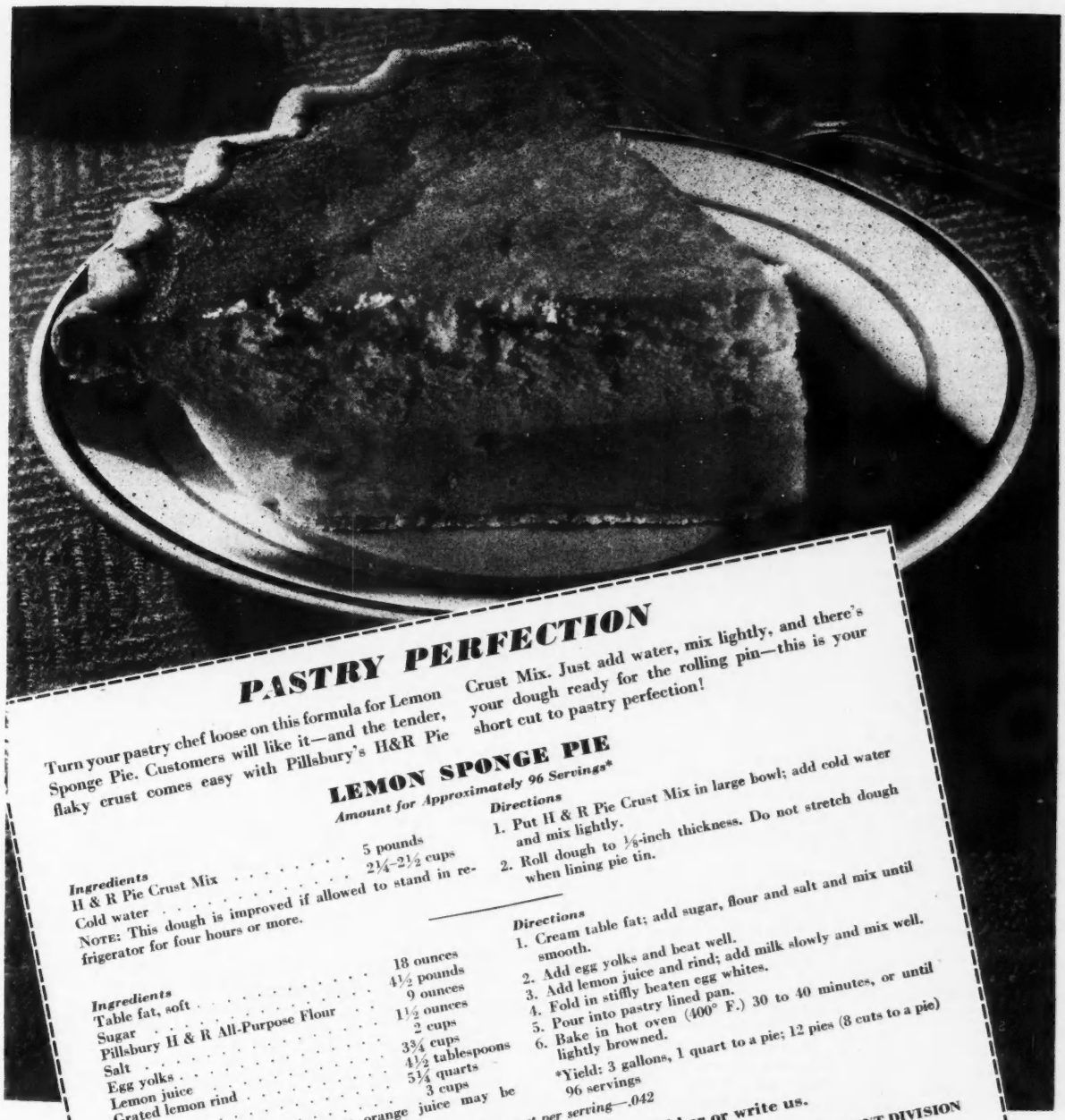
Air-borne Foods. Eighteen months of air-borne shipping have proved that the public prefers individual packaging, according to the president of the Ralph E. Myers Co., shippers of fresh fruits and vegetables, quoted in the *Food Field Reporter*, December 24. Standardized types of packages that have been accepted include: a 48-head lightweight cardboard carton for lettuce, with each head wrapped separately in cellophane; 1-lb. cardboard box with cellophane window, printed in bright colors, for peaches, pears, tomatoes, and other fruits; a flat oblong box for such items as berries, broccoli, beans, and peas; 1-lb. acetate bags for carrots, asparagus, artichokes, celery, radishes, and Brussels sprouts. The individual packages are placed in either flat two-level cardboard cartons, or in light wooden crates, each holding 48 to 60 packages.

Refrigeration is essential for air-borne produce. Spoilage occurs almost as rapidly at 10,000 ft. as on the ground. All fruit and vegetables shipped are now precooled, as well as being refrigerated in transit. This venture, which has been in the experimental stage since late 1944, has been fairly successful, it is stated. During the test period the company flew 60,000 lb. produce a week into Cleveland, Chicago, St. Louis, Boston, Philadelphia, and New York. Most loads went to delicatessens and supermarkets, and were sold at premium prices under the slogan, "Twenty-four hours from picking to store." At first the cargo planes of commercial airlines were used, but this year the firm has been using National Skyways, the freight-carrying line.

Containers. Shortages in materials for packaging food will continue during 1946, USDA predicts, although no serious bottlenecks are expected. Paperboard and tin plate will probably be short during most of the year, and glass containers will continue "tight" at least during the first quarter of 1946. Both wrapping paper and paperboard containers will be affected by the threatened drop in pulpwood production in the South. Until the labor supply increases, some re-use of paperboard containers may be encouraged.

Pots and Pans. USDA household equipment specialists offer the following points to check when buying the aluminum and stainless steel kettles and pans now reappearing on the market: Pan and handle should be well-balanced so that the pan stands steady even when empty. The smoother the pan—that is, the fewer the cracks at joinings—the more durable and easy to clean it will be. A flat bottom helps keep a pan steady and means faster heating and more economical use of fuel on electric, coal or wood ranges. Pans for use on electric stoves should have dull-finished bottoms to save fuel. Straight sides are more economical of heat and also of space on the stove than flaring sides. Handles of pans and covers should be comfortable to grasp and insulated against heat. A close-fitting cover is essential for many cooking processes, so buying a pan and cover together is advisable. Thin, lightweight sheet aluminum is less expensive and lighter to handle, but less durable. Stainless steel is more durable than aluminum of the same weight and thickness, and does not darken in cooking alkaline foods as aluminum does, but once darkened by overheating or scorching it cannot be brightened as aluminum can. Aluminum also spreads heat more evenly and offers less chance of scorching.

Precooked Frozen Foods. At the 1945 Food Service Directors Conference, W. L. Maxson, of the W. L. Maxson Corporation, stated that the company was ready to go into production of frozen precooked meals for commercial restaurants, hospitals, institutions, etc., and that it was expected that special diets as well as junior meals for children aged 3 to 6 years would soon be placed on the market. At present, complete frozen meals are being shipped to points as far away as Manilla and the Hawaiian Islands.



PASTRY PERFECTION

Turn your pastry chef loose on this formula for Lemon Sponge Pie. Customers will like it—and the tender, flaky crust comes easy with Pillsbury's H&R Pie Crust Mix. Just add water, mix lightly, and there's your dough ready for the rolling pin—this is your short cut to pastry perfection!

LEMON SPONGE PIE

*Amount for Approximately 96 Servings**

Ingredients	
H & R Pie Crust Mix	5 pounds
Cold water	2¼–2½ cups

NOTE: This dough is improved if allowed to stand in refrigerator for four hours or more.

Directions

1. Put H & R Pie Crust Mix in large bowl; add cold water and mix lightly.
2. Roll dough to ⅛-inch thickness. Do not stretch dough when lining pie tin.

Ingredients	
Table fat, soft	18 ounces
Sugar	4½ pounds
Pillsbury H & R All-Purpose Flour	9 ounces
Salt	1½ ounces
Egg yolks	2 cups
Lemon juice	3¾ cups
Grated lemon rind	4½ tablespoons
Milk	5¼ quarts
Egg whites	3 cups

SUGGESTED VARIATION: Lime or orange juice may be substituted for lemon.

Directions

1. Cream table fat; add sugar, flour and salt and mix until smooth.
2. Add egg yolks and beat well.
3. Add lemon juice and rind; add milk slowly and mix well.
4. Fold in stiffly beaten egg whites.
5. Pour into pastry lined pan.
6. Bake in hot oven (400° F.) 30 to 40 minutes, or until lightly browned.

*Yield: 3 gallons, 1 quart to a pie; 12 pies (8 cuts to a pie) 96 servings

Approximate cost per serving—.042

For menu tip-ons and recipe card see your jobber or write us.

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- H&R Pie Crust Mix
- H&R Biscuit Mix
- H&R Cake Donut Mix
- H&R Corn Muffin Mix
- H&R Bran Muffin Mix
- H&R Sweet Dough Mix
- H&R Coffee Cake Mix
- H&R Buckwheat Pancake Flour
- H&R Pancake Flour
- H&R Waffle Mix
- H&R Chocolate Cake Mix
- H&R Lemon Gold Cake Mix
- H&R Spice Cake Mix
- H&R Sno Sheen Cake Flour
- H&R All-Purpose Flour

The special ovens used for heating the trays of frozen precooked meals thaw and heat the food to a temperature of approximately 300°F. in 15 min. The temperature in the oven is held at 350°F. thermostatically. Mr. Maxson explained that the foods were only partially cooked at the processing plants and that the cooking was completed in the ovens. Ovens suitable for heating trays of meats and vegetables (prepared separately) sufficient to serve 60 or 70 people are being developed for institutional use. It is estimated that it would be possible to retail these meals in a restaurant at a price of from 60 to 90 cents. Two-portion trays and ovens will also be on the market for home use. Previously the foods have been prepared in one-portion amounts on individual plates.

Frozen precooked meals should be stored at 0°F. In fact, Mr. Maxson declared that no frozen food should be kept at a higher temperature. The meals can be kept for about 24 hr. after purchase at ordinary refrigerator temperatures.

The plates on which the frozen precooked meals are placed before packaging at the plant are composed of a substance which will withstand both the freezing and the subsequent heating, and may be had in any one of many attractive colors. For home use, they are individually packed in a laminated paper package which is heat-sealed.

Vitamin tests made for the Maxson Corporation indicate that the vitamin content of frozen precooked meals, when reheated in the specially-designed ovens, is approximately double that of meals cooked "under the usual conditions." According to a report by the U. S. Navy, quoted by Mr. Maxson, answers to a questionnaire indicated that, in the opinion of 90% of those served these meals in the Naval Air Transport Service, they were superior to meals prepared and served in any other manner.

Factories with a total capacity of about 800,000 meals per year are being built, near the sources of food supply. Seafood, for instance, will be processed, precooked, frozen, and packed in oven-size packages near New England seaports. Much new machinery has been developed for use in the plants. For example, a new French fryer will cook 1200 lb. potatoes per hour. Widespread distribution of all the foods will be accomplished eventually, but they will appear first in eastern markets.

Literature and further information concerning the frozen precooked meals, Mr. Maxson announced, may be obtained from Marion E. Gray, home economist, Maxson Food Products Corporation, 460 W. 34 St., New York.

Frozen Fish From India. The *Food Field Reporter*, December 24, reports that the establishment of plants for precooking and quick-freezing fish and other seafood in India for export is one of the problems currently receiving the attention of M. T. Zarotschenzeff, National Frosted Foods, New York, who has been conferring with an agent for the Indian government. Current plans call for the re-establishment and enlargement of fish freezing facilities established in 1933–37, at which time pomfret was being exported from Bombay to this country, and shrimp from Karachi. Added to the list will be Karachi sole, which, according to this report, is like Dover sole and hence superior to fish sold in this country under this designation.

Frozen Food Lockers. The October 15 issue of *Sales Management* states that a chain of frozen food stores which will open 109 stores in metropolitan New York is putting a "dietitian" in charge of each of the units. In the same article, a miniature frozen food center, including a processing room, locker room, and self service frozen food display cases designed for Refrigeration Corporation of America, is pictured

Publications on Frozen Foods. The National Restaurant Association *New Letter* offers the following list of publications on frozen foods: *Food Freezing*, John T. Ogden Publishing Company, 95 Liberty St., New York 6, subscription $4; *Frosted Food Field*, Grant Publications, 19 W. 44 St., New York 18, $5; *Quick Frozen Foods*, E. W. Williams Publications, Inc., 1328 Broadway, New York, $3.50; *Ice and Refrigeration*, Nickerson and Collins, 433 N. Waller Ave., Chicago 44, $3.

Tangerines. The Florida crop of tangerines is estimated at about 4,000,000 boxes of about 90 lb. each. California, Arizona and Texas also produce tangerines but in much smaller quantity, according to USDA. Arizona Experiment Station tests showed that most of the carotene of tangerines is in the flesh rather than the juice. Because the tangerine is eaten "in the flesh" rather than as juice, the eater gets the benefit of its carotene, as well as the vitamin C in both tissue and juice. Thus the tangerine, as commonly eaten, may offer more vitamins than the strained juice of other citrus fruits.

Effect of Sun and Shade on Vitamins. Studies by scientists so far indicate that sunshine increases vitamin C in fruit on the tree, according to USDA's *Food and Home Notes*, but recent tests of tangerines at the Arizona Experiment Station show that the fruit picked from the shady sides of the tree averaged 25% richer in vitamin A than the fruit from the sunny sides.

Tea in Tablet Form. Years of research by the Ceylon Tea Research Institute have resulted in the reduction of time for tea production from 25 to 2 hours, according to the National Restaurant Association *News Letter*, December 1. By means of this process, the tea is made into compressed tablets which will save shipping space, will be 50% stronger, and less expensive than tea in its present form. They are not yet on the market.

Frozen Juice Concentrates. Citrus juice concentrated by freezing instead of by the usual heating process is a product recently developed by the Florida Experiment Station, according to USDA's *Food and Home Notes*, December 3. Orange, tangerine, lemon, lime, and grapefruit concentrates have all been made successfully by freezing. Concentrates have usually been made by evaporating the juice by heating, but these have not proved ideal products because some of the fresh flavor is lost in the concentration process. Even low heat drives off the volatile flavors and aroma of the juice, and prolonged heating changes the acids and sugars and makes the pectin in the juice viscous. Freezing does not have these effects on the juice. As juice freezes, crystals of pure water form first. In the Florida process these crystals are separated from the rest of the juice. Freezing and separating are repeated until a thick concentrate remains which has the consistency of ice cream and can be packaged frozen in moistureproof cartons. Water in the right amount added to this concentrate thaws it in a few seconds, and the resulting beverage has almost all the flavor and bouquet of the fresh juice as well as most of the vitamin C.

Preserving Nut Meats. To can nut meats, first heat and dry in a slow oven, then pack hot in hot sterilized pint jars, and either process 15 min. in a boiling water bath with the water 2 in. up on the jar, or in a steam pressure canner 10 min. at 5 lb. pressure. This is a method developed by extension workers at the Mississippi Agricultural Experiment Station. Oklahoma scientists also report, according to *Food and Home Notes*, that nut meats can be kept fresh for 2 years by packing in moisture-proof containers and storing in freezer lockers.

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New features of this second edition include information on secretin, gastrin, enterogastrone, cholecystokinin, vilikinin, enterokinin. Additions to the sections on vitamins are new tables on Vitamin A; new material on thiamin, riboflavin, niacin, pantothenic acid, choline, para-aminobenzoic acid, biotin, inositol, folic acids, vitamin C, D, P and postulated vitamins. Patterns for meals and diet during pregnancy are also covered.

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Sauerkraut. More commercially canned sauerkraut is coming to market than was expected earlier. Home economists of USDA suggest that kraut be served either hot or cold. How much sharpness sauerkraut keeps when served hot, depends on how long it is cooked. To preserve the tang, just heat the kraut through. For a milder flavor, let it cook longer. Cold sauerkraut can be served plain, or drained and chopped in vegetable salad combinations. Savory sauerkraut, Norwegian-style, is made by browning ¼ cup or less of fat in a skillet, adding 1 qt. kraut and 1 tsp. celery or caraway seed, mixing well and cooking 5 min. Pennsylvania Dutch cooks add onion, apple, and a chopped potato. For a winter main dish, alternate layers of sauerkraut and cooked noodles with a top layer of ground pork sausage may be baked in a casserole.

Insecticide News. The first of a series of articles on insecticides, distributed free by Doherty, Clifford and Shenfield, Inc., 350 Fifth Ave., New York 1, states that the chemical preparation, DDT, requires careful handling if the best or even satisfactory results are to be obtained. Best results are obtained when DDT is combined with other killing agents. In the case of roaches, DDT powder or liquid formulas will not kill these pests any more effectively than will several other products, although they may remain effective for a somewhat longer period after treatment. Most dust preparations require 2 to 7 days to finish off a roach, according to the bulletin; whereas DDT, added to some of these in proper quantities, will speed up the kill. Roaches are destroyed chiefly through surface contact. In certain combinations containing DDT and other killing agents, some of the powder is swallowed. With these the killing value is double-barrelled, acting both as a stomach and contact poison.

The Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y., states that DDT emulsions are readily prepared through the use of a liquid non-ionic emulsifier, Nonaethylene Glycol Mono Oleate S 725. The amount of DDT required to give the desired concentration is dissolved in a suitable amount of a solvent such as Xylol, etc., and about 10% of the liquid S 725 is added to the DDT solvent solution, with which it is readily miscible. This DDT solvent concentrate is then added to the desired amount of water when and as needed, whereupon it forms emulsions with little or no agitation. Nonaethylene Glycol Mono Oleate S 725 is readily available in commercial quantities from the manufacturer. Samples may be obtained upon request.

Pattee's Dietetics. According to the publishers, G. P. Putnam and Sons, when Pattee's *Dietetics* was being printed, the publication of the pamphlet, Miscel. Pub. No. 572, USDA, entitled *Tables of Food Composition in Terms of Eleven Nutrients*, had been delayed because of a printers' strike. Reference to the pamphlet was therefore omitted in the first copies available for distribution. Later copies of the book include reference to the pamphlet on pages 635 and 708.

Correction. According to the authors, certain errors appeared in Table 1 of the paper, "Adaptation of a Short Method of Calculating the Nutritive Content of Diets for Use in Rural Areas of Middle Tennessee," by Ruth C. Steinkamp, William D. Robinson, and Margaret M. Kaser, in the September–October 1945 JOURNAL, namely: the calcium content of buttermilk biscuits made with enriched flour should be 18 mg. instead of 25; under whole grain and enriched cereals, 1 serving of whole wheat bread should be 1⅓ slices rather than ½; and ½ cup of custard should have a vitamin D value of 10 I.U.

Total Nutrition Should be Considered Before Making Diet Changes, according to a statement attributed to Dr. C. A. Elvehjem, University of Wisconsin, in *Food Field Reporter*, December 24. In a report to the Chicago Section of the American Chemical Society, Dr. Elvehjem stated, according to this report, that most workers in the field of nutrition regard a high level of protein in the diet as desirable, but that it has recently been discovered that a deficiency of vitamin B_6 develops faster on high protein diets. He also cited high dietary levels of fat which may tend to reduce tooth decay, but they also tend to reduce the necessary synthesis of vitamins in the intestinal tract.

Nutrition and Culinary Technique. This is the title of a new book in Spanish by Professor Esteban Kemény, published by Central de Publicaciones, Casilla 38, Santiago, Chile, and priced at 70 pesos, which may be remitted in money order, bank draft or check. The table of contents includes: historical review of the technique of nutrition, trends in dietetics, nomenclature, techniques in nutrition, culinary technique, the teaching of nutrition and culinary technique, the menu, national and international cuisine, types of cookery, kitchen and laboratory, utensils and equipment in the classroom kitchen, and tables of food composition.

Dorothy L. Heald, member of the American Dietetic Association, who has had considerable experience both in the hospital and commercial fields, has been appointed director of the home service department, A. E. Staley Manufacturing Company, Decatur, Illinois, processors of corn and soybean products. Miss Heald will devote her primary efforts to development of food research built around Sweetose, Staley's patented enzyme-converted corn syrup, according to a release from the company.

Margaret Shatswell Price, contributor of abstracts from Spanish publications to the current literature section of this JOURNAL, has announced the birth of a daughter, Mary Tudor, on December 4, at 802 N. Vermont St., Los Angeles 27.

Colorado Dietetic Association. A luncheon at the Brown Palace Hotel, Denver, opened the fall session on November 24. Among the guests attending the meeting was Alta Alexander, state representative on the school lunch program. Several extensive postwar projects were considered and the following section chairmen appointed: Community Nutrition, Dr. Elizabeth Dyar, Colorado A. & M. College; Diet Therapy, Doris Odle, Colorado General Hospital; Food Administration, J. Marie Melgaard, St. Luke's Hospital; and Professional Education, Lt. Maryethel Meyer, Fitzsimons General Hospital.

A detailed report of the 1945 Chicago session of the House of Delegates was presented by the Colorado member, Capt. Mildred Allbritton, chief dietitian, Fitzsimons General Hospital. Major L. Barbato, Fitzsimons General Hospital, discussed "Understanding the Patient," and Dr. Dyar spoke on "What is New in Nutrition."

Plans were considered in regard to reprinting copies of the A. D. A. *Courier* in order to make this publication available to all state members. Due to the many occupational changes, it was decided to initiate a Denver Placement Bureau, with Doris Odle as committee chairman.

Newly elected 1946 officers of the Denver Dietetic Association are: president, Mary Ellen Johnson, St. Luke's Hospital; secretary-treasurer, Mrs. Katherine K. Estabrook, Children's Hospital; and program chairman, Georgia Crane, Presbyterian Hospital.

At the October meeting at St. Luke's Hospital, Lts. Marcella Lantz, Dorothy Dickson, and Elinor Pierson, now stationed at Fitzsimons General Hospital, related some of their experiences overseas.

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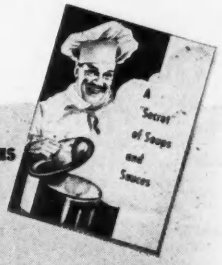

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Recent appointments at Denver General Hospital include: Mrs. Louise Poley, formerly assistant, now administrative dietitian, replacing Mrs. Leah Bressler, who has resigned to make her home in California; Mary O'Grady, formerly assistant dietitian at National Jewish Hospital; and Jane Taylor, formerly staff dietitian at Fitzsimons General Hospital, and for the past year WAC mess officer overseas. Miss Taylor is now teaching dietetics to student nurses.

Lt. Alvina Beran has returned from three years overseas duty and is now therapeutic dietitian at Fitzsimons General Hospital.

Lt. Freda Johnston, formerly staff dietitian at Fitzsimons, and recently engaged in organizing the mess at Lowry and Buckley Fields, has been married to Mr. J. Tillitson of Denver.

Margaret Schell, graduate of the student dietitian training course at Cook County Hospital, Chicago, is now assistant dietitian at St. Joseph's Hospital, Denver.

Two more dietitians have been appointed to Colorado state institutions: Julia Prescott to the State Industrial School for Boys, Golden; and Ethel Miller to the School for Mental Defectives, Ridge.

District of Columbia Dietetic Association. The 1945–46 session opened with a dinner meeting at the Eastern Star Building attended by nearly 70 members and their guests. Helen Brown presided and introduced the new officers as follows: president, Doris Sutton, St. Elizabeth's Hospital; president-elect, Melva Bakkie, Nutrition Service, American Red Cross; vice-president, Lt. Comdr. Marjorie Wood, U. S. Public Health Service; secretary, Ann Stewart Miller, Red Cross volunteer instructor; treasurer, Lucie Moorman, Gallinger Hospital; member, House of Delegates, F. Louise Hagel, for 1 year, for 2 years, Helen Brown, alternate, Miss Bakkie. The following section and committee chairmen were announced: Nominating Committee—Grace Bulman, Helen Brown, Kathryn Spencer, Dorothy Bovee, and Major Helen C. Burns; Food Administration, Grace Colby, assistant superintendent of dietitians, Veterans Administration; Professional Education, Commander Wood; Diet Therapy, Lt. Vivian Toolan, Walter Reed General Hospital; Community Nutrition, Clara Cerveny, Nutrition Service, American Red Cross; Program, Capt. Katharine E. Manchester, Office of the Surgeon General; Hospitality, Rowena Roberts, Sibley Hospital; Public Relations and editor of *Bulletin*, Lt. Ruby Winslow, Office of the Surgeon General; registrar, Georgia Smith, Chesapeake & Potomac Telephone Company; historian, Miss Brown.

Louise Hagel reported on the meeting of the A.D.A. House of Delegates. Of special interest to this association was her account of the address given by Lt. Ruby Motley, formerly secretary of the association before her assignment to the Philippine Islands.

Ruth Lusby, now with the Department of Agriculture and formerly with WFA, enumerated the functions of the Committee on Apprentice Training in Home Economics sponsored by the A.H.E.A., stressing the need for such training in business and other professional areas. Miss Lusby is a member of this committee which is composed of a chairman and 7 members, each of whom acts as chairman of a subcommittee in the areas of business, education, child development, extension, institution administration, journalism, and social welfare and public health. According to Miss Lusby, the purpose of the committee is to study the needs for apprenticeship in the several areas of home economics, and to develop standards for postgraduate training. "Home economists outside of the field of dietetics have been slow to accept the concept of an internship period because, in the past, it was possible to place girls immediately upon graduation. During recent years the opportunities for placing inexperienced graduates have been fewer, the age of graduation has been younger, and the need for an orientation period has become apparent." Miss Lusby stated that: "The Subcommittee on Apprentice Training in Institution Administration has acted on the assumption that there was no need to duplicate the established training courses of the American Dietetic Association and the National Restaurant Association. The objectives of the subcommittee have been to supplement the postgraduate training in institution administration and to expand the opportunities for apprenticeships, especially in the areas of industrial feeding and school lunchroom management. As the first step in this direction, the American Home Economics Association has approved the Pentagon Post Restaurants in Washington, D. C., as a training center in employee feeding management. The first group of apprentices was accepted November 1, 1945. Apprentice training in home economics in business and other professional areas is expected to be established within the near future."

Those present at the meeting were asked to fill in a questionnaire indicating the committees on which they were interested in serving and the type of meetings favored.

A business meeting of the officers and committee chairmen was held November 19 at Sibley Hospital. The association is planning to publish a bulletin to appear quarterly.

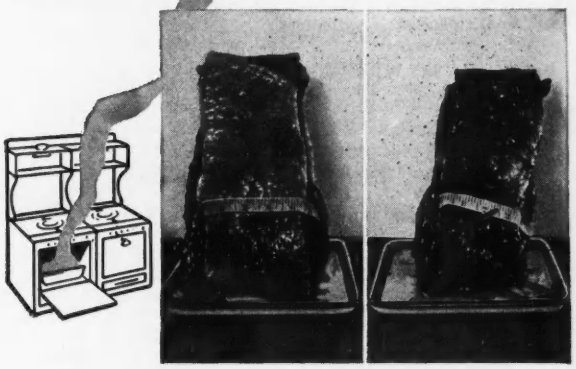
Iowa Dietetic Association. Officers for 1946 are: president, Elsie Ann Guthrie, Dormitory Food Service, Iowa State College; president-elect, Edna Kenney, University Hospitals, Iowa City; vice-president, Beatrice Donaldson, Department of Institution Management, Iowa State College; secretary, Mildred Torrance, Iowa Methodist Hospital, Des Moines; treasurer, Minna Wikoff, Currier Hall, Coe College, Cedar Rapids; members of the House of Delegates—Dr. Grace M. Augustine, Iowa State College; Gwendolyn Scharfenburg, Lutheran Hospital, Fort Dodge; and Helen Hunt, Veterans Hospital, Des Moines. Section chairmen are: Administration, Sister Mary St. Clara, Clarke College, Dubuque; Community Education, Beata Reager, Cherokee State Hospital; Professional Education, Edna Shalla, University Hospitals, Iowa City; and Diet Therapy, Leila Huebsch, Cornell College, Mt. Vernon.

The first postwar meeting of the association was held November 29 at Iowa State College and included the following speakers and subjects: Mrs. Bessie Brooks West, president, American Dietetic Association, "Plans and Policies of the A.D.A."; Dr. Grace M. Augustine, delegate's report of the House of Delegates meeting; Dr. Frank H. Spedding, director of the Institute of Atomic Research, Iowa State College, "Interpretations and Implications of Atomic Power"; Mr. Marcus Powell, instructor in hygiene and preventive medicine, University of Iowa, "Public Health Controls on Our Dairy Food Products"; and Harriet Roberts, research associate in food and nutrition, Iowa State College, "Calcium Metabolism in College Women and Older Women."

One of the projects recommended during the business meeting was the establishment of a quarterly bulletin to be prepared under the direction of the Publicity Committee, including: Miss Donaldson, chairman, Mrs. Elizabeth Tatum, Marjorie Giberson, and Dr. Elisabeth Sutherland.

The program for the meeting was planned by Edna Kenney with the assistance of Carolyn Cason. Local arrangements were under the direction of Miss Donaldson and Lenore Sullivan. Pupils of the latter served coffee to the members during registration and assisted at a tea which concluded the meeting. Exhibits displayed in the auditorium included material showing work which has been done on preparation of native Iowa food. This demonstration was planned by Dr. Gladys Everson, assisted by Ardis Hubbs and Grace S. Shugart.

STOP BURNING THAT MEAT



A series of roasting tests made with identical 50 lb. beef rib roasts showed savings of 4.05 to 7.25 lbs. on roasts slow-cooked by controlled temperatures in comparison with roasts fast-cooked at high temperatures. Note larger size of slow-cooked roast (at left).

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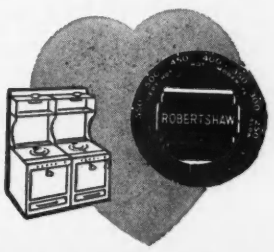

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Real Help On Your Citrus Fruit Budget

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CANE SUGAR, DEXTROSE, CONCENTRATED FRUIT JUICES, CITRIC ACID, ASCORBIC ACID, ESSENTIAL OILS and ARTIFICIAL FOOD COLOR.
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For only 54¢ a gallon, V-C-B provides a palatable beverage approximating the true flavor, caloric value and Vitamin C potency of fresh orange juice . . . 50 mgm. of Vitamin C and 50 calories to each 4-oz. liquid portion!

V-C-B also saves time and labor. You just add water. This two-fold economy . . . in money and work . . . has caused many institutions to adopt V-C-B as their standard for administering Vitamin C. V-C-B is also valuable for extending fruit juices and fortifying other beverages with the essential C vitamin.

There is no spoilage or waste with V-C-B. Hermetically sealed in oxygen-free containers, it keeps indefinitely; requires little storage space. You'll like V-C-B.

SEND FOR YOUR TRIAL ORDER NOW!

Single 1 lb. 12 oz. cans.....each	$ 1.50
1 Doz. 1 lb. 12 oz. cans.....doz.	13.50
3 Doz. 1 lb. 12 oz. cans.....doz.	13.25
6 Doz. 1 lb. 12 oz. cans.....doz.	13.00

VITAMIN PRODUCTS DIVISION

HILKER & BLETSCH COMPANY

614 W. HUBBARD ST. CHICAGO 10, ILL.

Among the guests was Florence Unash, recently appointed nutritionist in the State Department of Health.

Michigan Dietetic Association. Frances MacKinnon visited Ann Arbor, November 28 to December 1, speaking before the dietetic and pediatric staff of the University Hospital and the Latin-American students enrolled in the School of Public Health.

Jean Hughes has returned to the institutional management staff of the Home Economics Department, Wayne University.

Jane Wyatt is now with the Nutrition Division, Detroit Department of Health.

Dr. Edna Brown joined the foods and nutrition staff, Michigan State College, in January. She holds the B.S. and M.S. degrees from the University of Cincinnati and the Ph.D. degree from Iowa State College. Her student dietitian training was at the University of Michigan Hospital.

Mrs. Paul Dexheimer Casstevens has announced the birth of a daughter, Kathryn Louise, on November 16. Her present address is 1232 Prospect, Ann Arbor.

Mrs. Margaret McLaughlin Craw is now residing at the Town House, Petoskey; Mrs. Esther Lieberman Stuhlberg, at 514 Pinehurst, Kalamazoo, where her husband, Mr. Julius Stuhlberg, is associated with the music department at Western State Teachers College.

Mary I. Barber writes under date of December 13: "Last week the Committee on Food Research met at the Subsistence Laboratory, Chicago. The discussions were on "Food Acceptance Research." About sixty people attended, many of them members of the American Dietetic Association. Research as carried on in various states was reported. The objective is to pool and evaluate all information on food consumption habits and nutrition so that food for the Army, for example, can be purchased in such a way as to meet with acceptance. This will, of course, be a limiting factor on waste."

Ohio Dietetic Association. Members of the association attended an old-fashioned Christmas Party at Peoples Hospital in Akron. True to tradition, the halls were decked with holly, and Christmas carols and a buffet supper were part of the festivities. Ellen Martin, Children's Hospital, was chairman of the program committee.

Julia Dearchs, National Dairy Council, is now secretary of the Akron association, replacing Mrs. Hazel Hooker who resigned.

Margaret Oliphant, recent graduate of St. Luke's Hospital, Cleveland, is now assistant, Children's Hospital, Akron.

Recent marriages include: Margaret K. Ferry, Good Samaritan Hospital, Cincinnati, to Lt. Dwight Morris, East Orange, N. J.; and Ruth Ring, General Hospital, Cincinnati, to Lt. Michael Brandt, Kohler, Wis.

Newcomers to Cincinnati include: Beverly Van Deventer, Iowa State College and Peter Bent Brigham Hospital, to Nurses Home Cafeteria, General Hospital; Mrs. Harriet Gold, University of Cincinnati and Jewish Hospital, Brooklyn, and Lillian Lanzi to General Hospital as ward dietitians; Mrs. Ruth Ray Hudson, University of Missouri and Christ Hospital, now assistant floor kitchen supervisor at Christ Hospital; Florence Schrock, formerly of Southern Baptist Hospital, to Cincinnati Red Cross as assistant to Miriam Lage Jackson.

Lt. and Mrs. John E. Gregory have announced the birth of a daughter, Susan Kay, December 3, Indianapolis. Mrs. Gregory was formerly Norma Pandorf, assistant at Mt. Sinai Hospital, Cleveland, and Christ Hospital, Cincinnati.

Betty Johnson and Viena Koski, recent graduates of the Christ Hospital training course, have accepted positions at Lutheran Hospital, Des Moines, and the University of Chicago Hospital, respectively.

Newcomers to Cleveland are: Mary Agnes Pohl, supervisor of employee training at St. Luke's Hospital; Betty Valderick, assistant, and Sister Auria, teaching dietitian, St. Alexis Hospital; Mrs. Audrey C. Jones, personnel dietitian, Huron Road Hospital.

Mr. and Mrs. Herman Malbin have announced the birth of a son, John Lewis. Mrs. Malbin, formerly Phyllis Rockstein, was an assistant dietitian at Mt. Sinai Hospital.

Mr. and Mrs. I. G. Orellana have announced the birth of a son, William Bryant. Mrs. Orellana formerly taught nutrition classes and relieved various staff dietitians at Mt. Sinai Hospital.

Mildred Osborne, Huron Road Hospital, was married recently to Capt. William J. Klapprath, Jr.

Newcomers to the Columbus area include: Zada McCurdy, administrative assistant, and Mrs. Elizabeth Nesslein, pediatric dietitian, White Cross Hospital.

Henrietta Joyce, assistant dietitian, White Cross Hospital, was married recently to Staff Sargeant H. C. Leuzwiger.

Dr. and Mrs. Robert Inglis have announced the birth of a daughter. Mrs. Inglis was formerly therapeutic dietitian, White Cross Hospital.

Mary Leatherman, formerly of Springfield City Hospital, is now administrative dietitian, Mt. Carmel Hospital, Columbus.

Mrs. Betty Hunter, therapeutic dietitian at Ohio State University Hospital, is on leave of absence to join her husband who has returned from overseas. Bernice Trees is temporarily filling Mrs. Hunter's position.

Helen Pond, dietitian at St. Luke's Hospital, Tokyo, for 17 years, later a resident of Manila, and finally a prisoner at Los Banos camp until February 1945, recently told of her experiences at a dinner meeting of the Columbus association.

Speakers at meetings of the Dayton Dietetic Association included Marguerite Krebs of the Dairy Council, who showed nutrition films and gave a short talk, illustrated by two families of dolls, demonstrating good and poor nutrition; a Russian meeting at which Mrs. Fannie Chazin, dressed in native costume, served Russian food; and a talk by Dr. Thomas P. Sharkey on diabetes.

Newcomers to Dayton include: Mrs. Phyllis Nussmeyer Murtaugh, now at Miami Valley Hospital after residing in Chicago for several years; Janice Kauffman and Evelyn Langston, now with the Frigidaire Corporation; Lt. Rosemary Hopkins and Mrs. Johnnie Boone, Patterson Field Hospital; Bernice Brown, administrative assistant, Good Samaritan Hospital.

Grace Schweiger has been transferred to the Veterans Hospital, Milwaukee, and Loretta Carney is now acting chief at the Veterans Hospital, Dayton.

Frances Tamarkin, Ohio State University and Michael Reese Hospital graduate, is now assistant therapeutic dietitian at the south side unit of the Youngstown Hospital.

Edna Gilbert, director of school lunchrooms, Youngstown, taught a 2-week course entitled "Workshop for School Lunchroom Managers" at the University of Alabama, and also at Columbia University during the past year.

Inistore Simms is discussing plans for a complete set of kitchens and offices for her dietary department at the northside unit of the Youngstown Hospital.

Mrs. Lillian Haskel Keefer, a former hospital dietitian, is now manager of East High School lunchroom.

Mrs. Winifred Dickson, assistant dietitian at Lima Memorial Hospital, has resigned to join her husband at their home in Escanaba, Mich.

IN PINEAPPLE
LOOK TO LIBBY'S FOR PERFECTION

Of course there is still no abundance of Libby's Pineapple. But—when you do get a few cases of this famous brand you have Hawaiian pineapple at its flavor-*best*. For Libby picks pineapple at *peak flavor* . . . and skillfully captures and keeps for you the ripe richness and refreshing tang of pineapple at the *height* of its glory.

LIBBY, McNEILL & LIBBY, Chicago 9, Ill.

Please 'em with this

PINEAPPLE UPSIDE DOWN CAKE

INGREDIENTS	WEIGHT OR AMOUNT	MEASURE
Egg whites	1 lb. (16 whites)	2 c.
Egg yolks	10⅔ oz. (16 yolks)	1⅓ c.
Sugar	2 lbs.	4 c.
Cake flour, sifted	14 oz.	4 c.
Baking powder	4 t.	4 t.
Salt	1 t.	1 t.
Water	1 c.	1 c.
Vanilla	4 t.	4 t.
Butter or fortified margarine	4 oz.	½ c.
Brown sugar	9 oz.	1½ c.
Libby's Sliced Pineapple*	3 No. 2 cans	24 slices

METHOD: Beat egg whites on third speed until stiff. Add egg yolks; beat well on third speed. Add sugar gradually, beating until light and lemon colored. Sift flour, baking powder, and salt together. Fold flour into egg mixture with French whip. Use just enough strokes to get flour folded in thoroughly. Add water and vanilla. Blend thoroughly. Melt butter and blend with brown sugar. Spread over the bottom of 2 baking pans (9 x 14). Arrange pineapple slices, cut into halves, on sugar mixture allowing 24 to a pan. Pour batter over mixture. Bake in a slow oven (325° F.) for 1 hour. Remove cakes from the pans as soon as they are baked. Cut each pan 4 x 6. Allow ½ slice pineapple to each serving. Serve hot or cold with or without whipped cream.

NUMBER OF SERVINGS: approximately 48

SIZE OF SERVING: 2¼ inches x 2⅓ inches

**Libby's *Fruit Cocktail, Peaches, or Pears may be used.*

From the Kitchen of Mary Hale Martin

Libby, McNeill & Libby, Chicago 9.

Pittsburgh Dietetic Association. Officers for 1946 are: president, Alice Mock, Allegheny General Hospital; vice-president, Alice Yakulis, H. J. Heinz Company; secretary, Peg Watson, Pittsburgh District Dairy Council; treasurer, Mary Borland, Renziehausen Ward of Children's Hospital. Chairmen include: Membership, Clarice McCullough, Magee Hospital; Program, Miss Yakulis; Administrative, Marianna Halpern, South Hills High School; Publicity, Marion Mock, Allegheny General Hospital.

At the November meeting, Mr. J. L. Ogden, district manager, Aluminum Cooking Utensils Company, discussed "What's New in Aluminum."

The following news has been received of dietitians in Army service: Lt. Josephine Wegley is now stationed at Camp Polk, Va.; Lt. Alice Knox, recently returned from overseas, is at Fort Knox, Ky.; Lt. Rosemary Stewart, who was stationed in Okinawa, is now at her home in Grove City, Pa.; Lts. M. J. Wiedel and Shirley Wing have also returned from overseas; Lt. Eleanor Mathewson, formerly chief dietitian, Robert Packer Hospital, Sayre, Pa., is now at Deshon General Hospital, Butler, Pa.; Lt. Alene Ness, formerly therapeutic dietitian at Shadyside Hospital, has returned from the ETO. Lieutenant Ness reenlisted in the Army and is stationed at Nicholas General Hospital, Louisville, Ky. Lt. Sylvia Levie is now at Baxter General Hospital, Spokane, Wash.

Irene L. Willson, chief dietitian, Shadyside Hospital, addressed the recent meeting of the West Virginia State Nurses Association at Charleston, on "The Place of the Nurse in the Nutrition Program."

The following have been added to the Dietary Department of Presbyterian Hospital: Ina Jane Elliott as therapeutic dietitian; Jean Loftis as staff dietitian; Ruth Matthews in charge of private tray service; and Jane Ellen Meese as instructor. Other appointments include the following: Gertrude Edinger is now in charge of the Employee's Cafeteria, Joseph Horne Company. Carolyn Flickinger, formerly at Citizens General Hospital, New Kensington, is now at Washington Hospital. Constance Weiss is with the Southern California Gas Company, and living at 1026 Tiverton Ave., Los Angeles. Helen Klute, formerly of Ohio Valley Hospital, is at Montefiore Hospital, replacing Mary Warmuth, now at Aultman Hospital, Canton, Ohio. Mrs. Jennie Barton Nichols, chairman, A.D.A. Legislative Committee, is now nutrition instructor, Providence Hospital, Washington. Martha Pillar is at Children's Hospital. Mrs. Rosetta Wollett is now chief dietitian at Homestead Hospital, and in addition has taught nutrition to Red Cross groups, headed the Homestead Canteen at their blood bank, and was one of a group serving food to members of the armed forces at the airport. Lois Licthenthaler is now administrative dietitian at Magee Hospital. Marian Sizelove, formerly staff dietitian at Allegheny General Hospital, is now graduate assistant in nutrition research under Dr. Margaret A. Ohlson, Michigan State College. Rutha Ada Arms and Jane Dunlap have resigned from Allegheny General Hospital, Miss Arms to accept an appointment as assistant dietitian at York Hospital, and Miss Dunlap to continue her studies in Kansas City. Ruth Frill and Mrs. Fayetta Powell have joined the dietetic staff, St. Francis Hospital.

Recent graduates of the dietitian training course at Shadyside Hospital have accepted the following appointments: Helen De Martini, Billings General Hospital, Fort Benjamin Harrison, Ind.; Elizabeth McConnell, Ellwood City Hospital, Pa.; Virginia Joyce, New Haven Hospital, Conn.; and Carolyn Hixson, Westmoreland Hospital, Greensburg, Pa.

Students now at Shadyside Hospital include: Patricia Putnam, Kansas State College; Mary Scott, Syracuse University; Edith Collins, Florida State College; Uldena Harper, University of West Virginia; and Dorothy Beachley, Pennsylvania State College.

Graduates of the approved training course at Allegheny General Hospital have received the following appointments: Eileen Schill, Army dietitian; Mary Sever, Esther Baker, and Betty Colbert, therapeutic dietitians at St. Mary's Hospital, Ann Arbor, Mich., Columbia Hospital, Pittsburgh, and Mt. Sinai Hospital, Baltimore, respectively; Jeanne DeHaven, assistant administrative dietitian, Allegheny General Hospital; and Margaret Farrant at Frankfort, Kans.

Students at Allegheny General Hospital are: Annabelle Brown, Mt. Mercy College; Edythe Morris, Pennsylvania State College; Martha J. Hayes, Maryville College; and Ethel Maynard, University of Connecticut.

The following marriages have been announced: Alice Mock, Allegheny General Hospital, to Mr. John J. Beckman; Elizabeth Rugh to Mr. Homer F. Bair of Greensburgh, Pa.; Mary Brown, Shadyside Hospital, to Lt. Robert Watkins; Loventrice Turner, West Penn Hospital, to Sgt. Edward Harns.

St. Louis Dietetic Association. Eighty members and guests attended the December meeting which opened with a dinner.

Mr. Earl Woodard, formerly a navigator on a flying fortress, gave an account of his experiences after being shot down in France and of his rescue and safe return to England due to the efforts of the French Underground. A large collection of Christmas presents were brought by the association members for the children at Shriner's Hospital for Crippled Children.

South Carolina Dietetic Association. Officers elected at the annual meeting in October were: Mildred Anne Stevens, Charleston Navy Yard, president; Roberta London, Rock Hill, vice-president; Mrs. Mildred Meyer, Veterans Hospital, Columbia, secretary; and Nadeene S. Brunini, Veterans Hospital, Columbia, treasurer. Julia Obenshain, Tumey Hospital, Sumter, was elected chairman of the Nominating Committee.

The South Carolina Nutrition Committee held a state rally in Columbia, November 9, for the purpose of discussing nutritional problems in the state. Dr. Walter Wilkins, U. S. Public Health Service, gave a talk on regional and national nutritional problems. A panel discussion on "Enriched Corn Meal and Grits" was led by Dr. Ben Wyman, state health officer. Among those participating was Ada M. Moser, state chairman of the Community Education Section, A.D.A.

An excellent report of the meeting of the A.D.A. House of Delegates in Chicago by Gladys L. Stoddart appeared in the fall issue of the *Palmetto Leaf*, bulletin of the state association. A separate article in the same issue describes the work of Ruby Motley and Frances MacKinnon as recounted by them at the Chicago meeting.

Texas Dietetic Association. A joint meeting of the 1945 and the 1946 executive boards was held in Waco, November 10. Officers for 1946 are: president, Laura McLaughlin, Texas State College for Women, Denton; president-elect, Blake Bryson Patrick, Rice Institute, Houston; vice-president, Lillian Johnson, West Texas Hospital, Lubbock; treasurer, Grace Sweatt, Brackenridge Hall, Austin; secretary, Frances Welch, Chilton Hall, North Texas State Teachers College.

Drewsilla Beams, retiring secretary, reported 114 active members in the association.

Mary E. Smith, historian, presented the completed portion of her project.

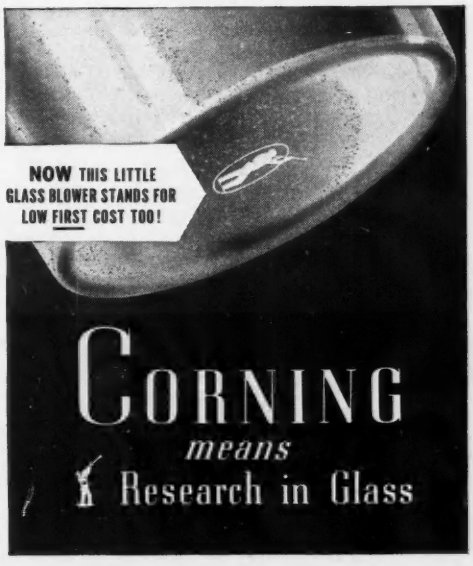
The South Texas Dietetic Association has extended an invitation to the state association to meet in Houston for the annual convention March 8-9.

New Low Prices on CORNING DOUBLE-TOUGH TUMBLERS!

See your DOUBLE-TOUGH Distributor today for Exciting Reductions on the TOUGHEST TUMBLER MADE!

GREAT money-saving news! They're the same famous Corning Double-Toughs that have been cutting breakage costs in half for tumbler users all over the country. Now—at new rock-bottom prices—they come to you for little more than you would pay for run-of-the-mine tumblers! Nothing has been changed but the price. They're sparkling clear. They're thin and lovely. They're lightweight. And they're specially processed by Corning to stand up at least twice as long under rough handling (many users claim longer). Figure the savings for yourself! Place your order now for quick delivery. Sold only through authorized Double-Tough Distributors. Don't put it off. See yours today!

CONSUMER PRODUCTS DIVISION—Corning Glass Works, Corning, New York.



Wisconsin Dietetic Association. Student dietitians now at Milwaukee County Hospital include: Ethel Marie Anderson, University of Utah; Doris Dickinson, Montana State College; Kathryn Blotz, University of Wisconsin; Ethelyn Engebretson, St. Olaf College; Ruth Lange, and Ann Wiebrecht, Iowa State College. Last year's class of students report the following assignments: Alice Harper, Vanderbilt University Hospital; Eleanor Halter, St. Luke's Hospital; Mary Ellen Ruple, Western Reserve University Hospitals; Doris Uhlich and Dorothy Schroeder, Milwaukee County Hospital.

Mrs. Olive Ludwig Royce has resigned as staff dietitian, Milwaukee County Hospital, on the return of her husband from overseas. Mrs. Doris Dyke has also resigned. Both had been appointed temporarily to fill vacancies of dietitians serving in the armed forces.

The Christmas meeting of the Milwaukee Dietetic Association was held at Milwaukee Children's Hospital. A group of carols opened the program, followed by dessert and coffee. The remainder of the evening was devoted to a "Dietetic Workshop" conducted by Nell Clausen. Instead of the usual procedure of exchanging gifts, members each brought a gift of clothing or toys for children overseas. Guests for the evening were Lillian Otto Fried, manager of Ann Emery Hall, Madison; Annette Snapper, recently returned from her third trip to Europe to study food conditions; and Mary Turner, home service director, Potomac Electric Power Company, Washington. New members in attendance were Nathalie Weseman, Frances Gentile, and Fern Armour.

Dorothy Hamm, formerly assistant dietitian, St. Mary's Hospital, Milwaukee, is now in charge of the Dietary Department, Mount Sinai Hospital.

Helene Henley is now chief dietitian, Columbia Hospital, succeeding Bernice Stark who recently resigned.

News From Advertisers and Exhibitors. A release from the Westinghouse Editorial Service, Box 1017, Pittsburgh 30, Pa., states that invisible bactericidal rays sprayed by a new U-shape ultraviolet lamp can reduce the bacteria count in washed milk cans 96% in one minute. This report from the Westinghouse Lamp Division Research Laboratories was based upon tests conducted under conditions of contamination more extreme than would ever be encountered in normal service. Although longer irradiation brought slightly better results, for practical purposes in a dairy adequate bacteria-killing efficiency is obtained in one minute. Bent U-shape to obtain maximum radiation of all exposed areas in a can, including the hard-to-reach areas in the shoulder, the 30-inch lamp fits into any conventional size dairy utensil. Operating on standard 110–120 volts alternating current circuits, the unit consumes less electricity than a 25-watt electric light bulb.

Announcement is made by Mr. Roud McCann, director, American Dry Milk Institute, Inc., Chicago, of the appointment of Mr. Harold Hall, as staff member. Mr. Hall for the past three years has been connected with the Chicago Quartermaster Depot, in charge of procurement and production of bakery products for the special rations of the armed forces. He is a graduate of Trent Institute, Canada, where he conducted postgraduate work on soft wheat flour research.

The November issue of *Food & Nutrition*, published by the National Live Stock and Meat Board, Chicago 5, presents a general discussion on principles of meat cookery, and specific directions for best results in roasting, broiling, frying, and braising of various cuts of meat. Copies of this issue in quantities for student distribution may be secured free of charge by writing to the company.

The October issue of the above-mentioned publication carries an article on "Protein and Anemia" by Dr. Ruth M. Leverton, associate professor in human nutrition research, University of Nebraska, and member of the American Dietetic Association. In 100 one-week studies of the nitrogen and mineral metabolism of college-age women on self-chosen diets, Dr. Leverton found that the intake of protein was closely associated with the hemoglobin concentration of the blood. The students who had normal hemoglobin values in spite of low iron intakes, had a daily intake of 60 gm. protein, whereas the students who had subnormal hemoglobin values on the same low iron intake averaged only 45 gm. protein daily. This issue also contains an article on "Nutrition and Health" by Anna E. Boller, director, Department of Nutrition, National Live Stock and Meat Board, which lists various signs of malnutrition and suggestions for possible solution of this problem. Copies are available upon application.

General Foods Corporation, 250 Park Ave., New York 17, announces that Birds Eye-Snider Division has begun construction of a new frozen food packaging and processing plant at Walla Walla, Wash. The new plant will provide greatly increased production of quick-frozen Birds Eye peas, spinach, and broccoli.

The first general sales meeting in two and one half years was held recently by the Consumer Products Division of Corning Glass Works, at Corning, N. Y. In Corning's research laboratory the group saw many of the new developments in glass, and the continuous quality control tests to which Pyrex brand ware as well as all other Corning products are subjected. Existing products in the consumer line include Pyrex brand ovenware and flameware, Corning brand tableware and beverage ware, and Double-Tough tumblers.

A recent issue of Libby's *Kitchen Chatter* includes a chart showing the growth of the tomato juice industry from a pack of only 1,339,000 cases in 1930 to one of 26,487,000 in 1944. It was estimated that the 1945 pack would be the largest on record. An approximate analysis of the nutritive value of an average serving (6 oz.) Libby's tomato juice is given as follows: calories 41, protein 1.55 gm., fat .068 gm., carbohydrate 8.45 gm., calcium .015 gm., phosphorus .032 gm., iron 2.9 mg., thiamin .088 mg., riboflavin .058 mg., ascorbic acid 33.2 mg., vitamin A 1595 I.U. Among the recipes included in this issue were tomato-corn chowder, molded main dish salad, and spicy tomato cake, all of which use tomato juice as an ingredient.

Electronic Cooker

The December 1 issue of the National Restaurant Association *News Letter* pictures and describes an electronic grill cooker, made by the Automatic Canteen Company of America, in which hot sandwiches are cooked automatically. The customer selects the kind of hot sandwich he desires, drops a coin into the grill, and the cellophane-wrapped sandwich automatically drops into the transparent heating chamber. Kitchen fresh, piping hot, the sandwich is delivered in a few seconds. Complete sanitation and odorless cooking are assured by the dustproof, moistureproof wrapper which prevents contact with hands or machine prior to being served to the purchaser. A transparent cylinder is the heating chamber into which the sandwich drops. Current passing through the coil, spiraling around it from the electronic tubes on either side, sets up a high frequency current within the cylinder. The resistance offered by the sandwich generates heat which cooks the meat, cheese, frankfurter or any other filling. Cooking is absolutely uniform as heat is generated *within* the food, evenly throughout its bulk. These machines are not on the market but are used by the above-mentioned company for its own supplementary food service operations. One such machine has been in operation in the Chicago area for almost two years.

LADY, will you take thirty-two seconds to read these facts?

© Borden Co.

We thought you'd like the *1-2-3-4* about Hemo. So, here goes:

1. Hemo is a *special-purpose* food, a sound food drink with significant vitamin and mineral fortification.
2. Hemo is taste-tempting, attractive to young and old taste, with a delightful *milk-chocolate* flavor.
3. Hemo is advertised to the public as a *supplement* to regular meals—not as a medicine or a cure-all. It's sold as a *good food!*
4. Hemo's vitamin and mineral content compares favorably with minimum daily requirements of these food essentials, as set up by government authority. Just look below!

Hemo compared with minimum daily adult requirements*

	Minimum Daily Adult Requirements*	1½ ounces of Hemo and 16 fluid ounces of milk (2 glasses)	1½ ounces (2 servings) of Hemo Powder
Vitamin A	4000 U. S. P. Units	4900	4000
Vitamin B_1	333 U. S. P. Units	400	333
Vitamin B_2	2 Milligrams	3	2
Vitamin D	400 U. S. P. Units	410	400
Niacin amide	* *	10.3 mg.	10 mg.
Iron	10 Milligrams	15.7	14.7
Calcium	750 Milligrams	950	376
Phosphorus	750 Milligrams	750	288

*As set by Federal Security Administrator under authority of the Federal Food, Drug, and Cosmetic Act. (Hemo does not contain Vitamin C.)

**Minimum daily adult requirements not yet fully established.

Borden's
Hemo

IF IT'S BORDEN'S, IT'S GOT TO BE GOOD!

Available in all drug and grocery stores

Feeding the Army Overseas

Col. Charles R. Williams presented a first-hand account of his experiences in the tropical theatres, particularly in India, where he was assigned to establish a general hospital early in the war. During this long period he was confronted with many varied problems. Outstanding were those dealing with feeding the troops.

Often difficulties arose between the dietitians and the Quartermaster Corps, particularly involving substitutions for rations ordered by the dietitians and sent by the Q.M.C. One example of this was that in which the latter sent "corned willy"—that famous army corned beef—as a substitute for carrots, which were to be used on soft diets for 167 diarrhea cases. Then there was the quartermaster who informed the dietitian that there was no need for more than three diets in a hospital: the general, the light, and soft. When asked where he learned about diets, he said from his wife, who was the best cook in America!

The first evidence of dietary deficiencies appeared late in 1943. There were typical cases of pellagra. Certain skin conditions suggested scurvy. Other patients were afflicted with night blindness. One of the most marked deficiencies showed up in the fracture cases, for even after nine months in the hospital these patients showed a decided lack of bone healing. Coupled with this evidence of calcium deficiency was an increase in dental caries.

There were various secondary factors which caused these deficiencies, Colonel Williams explained. The psychoneurotic states of anxiety particularly interfered with the ingestion of food, and were associated with vomiting, loss of weight, and even anemia. Moreover, the excessive heat and humidity interfered with the normal desire for food. Colonel Williams referred to a study on animals conducted by Mills, who found that at 91°F. animals ate only two thirds the amount of food as at 65°F.

Another cause of dietary deficiencies was the prolonged use of "Iron Rations." While satisfactory for short periods, they became monotonous and even repulsive after a time, and the soldiers preferred to make their meals of jam, bread, and coffee. It seemed that continued use of atabrine or quinine in malarial cases caused an interference in the utilization of food. This was noted by a loss of weight in these men.

The thiamin losses were greater in this area because of the increased excretion through the skin in the copious perspiration under tropical heat. Moreover, the thiamin needs were increased incident to an unusually high carbohydrate diet.—*Excerpts from a report in the September 1945 Bulletin of the Missouri Dietetic Association.*

Vitamin B Complex in Diabetes Mellitus

It is generally believed that in uncontrolled diabetes with glycosuria, polyuria and hyperglycemia the body may lack needed nutrients such as vitamins partly through loss by excretion and partly because the metabolic disturbance prevents their normal utilization. Therefore, while the diabetes is being brought under control by means of insulin and a diabetic diet, vitamin B complex may well be given, especially when diabetic coma has been present. Thiamine, riboflavin and nicotinic acid are considered to have a necessary place in the intermediary steps in carbohydrate metabolism (Soskin, in Wohl's *Dietotherapy*, 1945, p. 57).

Experiments such as those of Styron and his co-workers have been carried out in which diabetic rats and nondiabetic rats were studied during experimental thiamine deprivation and during the recovery when treatment with thiamine was given. No difference was observed in the length of time required by diabetic and nondiabetic rats to develop signs of deficiency. During the period of deprivation the glycosuria of the diabetic rats diminished, presumably because of the lowered food intake. Urinary sugar tended to reappear at the final stage of the deficiency during the time of polyneuritis. The carbohydrate tolerance tests showed little change until signs of pronounced deficiency appeared. Thus, lowered tolerance occurred when, by reason of the neuritis, muscular activity and power were lost. Actually when thiamine intake was greatly increased, carbohydrate tolerance seemed to improve. Vorhaus, Labbé and Mosonyi and their co-workers have reported improvement. Martin has described intensification of diabetes in depancreatized dogs on a vitamin B free diet, with great improvement in carbohydrate tolerance when thiamine and riboflavin were given. Other workers, notably Lepovsky, Wood and Evans and McIntyre and Burke, have recorded but little change in glucose tolerance either with deficiency or with excess of vitamin B. An extensive literature on thiamine is given by Williams and Spies. Wilder states that "at present the evidence of value in diabetes from therapeutic doses of the vitamin B complex, or any of its constituents, is conflicting but suggestive. The diabetic organism probably requires more vitamin B_1 than easily is obtained in a mixed diet. When diets high in white flour are prescribed the danger of deficiency is increased, and with such diets it probably is wise to supplement the intake of the entire vitamin B complex by giving brewers' yeast. It has not been shown that doses of thiamine or riboflavin in excess of the amounts of these obtainable in well planned diets are therapeutically effective, except in cases in which the intake of these substances previously has been deficient." Certainly the therapeutic effect of giving vitamin B complex is not comparable in degree with that of a carefully balanced diet and insulin.

In cases of diabetes in which febrile complication, infections, pregnancy, lactation or achlorhydria have increased the need for or impaired the utilization of vitamins or when a definite neuropathy is present, vitamin B complex is generally useful. When a complicating vitamin deficiency exists, its relief may also be accompanied by improvement of the diabetes.—*Queries and Minor Notes, J.A.M.A. 129:839, 1945.*